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CONTENTS

	PAGE
Arctic Duty (Cont.).—Green	2455
The Navy Yard Spirit.—Fisher	2495
What Happens in an Audion.—Will	2505
Amusing Fifty Thousand Men.—Green	2527
Altitude, Azimuth and Hour-Angle Diagram.—Littlehales	2541
An Instantaneous Dead Reckoner.—Zimermann	2547
The Moon in Navigation.—Sparrow	2553
Notes on Ship Handling.—Burrage	2555
Course in Marine Engineering for Reserve Officers.—Meyers	2563
Discussion	2577
Minutes of the Annual Meeting, 1917	2578
Secretary's Notes	2588
Professional Notes	2593
International Notes: Naval War Notes	2699
International Notes: Diplomatic Notes	2762
Review of Books	2777
Information Index	2592

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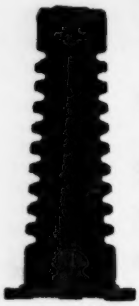

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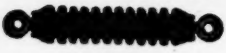

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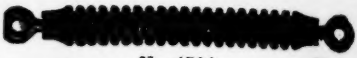

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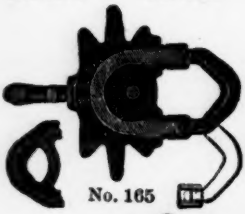

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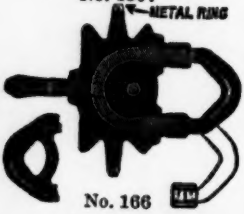

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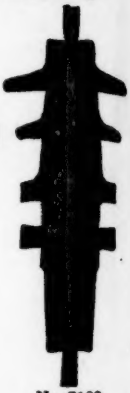

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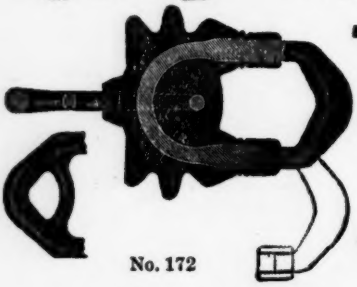

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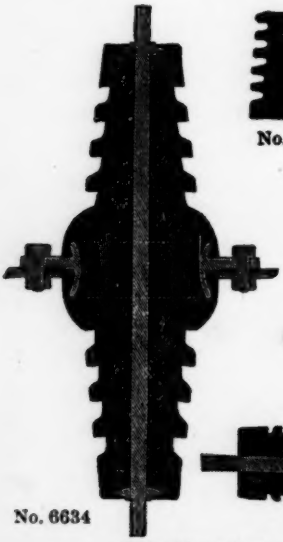

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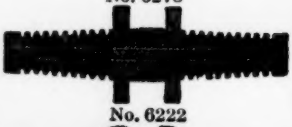

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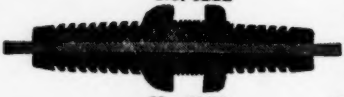

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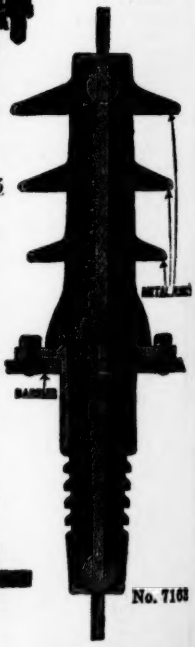

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CONTENTS

ARCTIC DUTY; with the Crocker Land Expedition (Continued). By Lieutenant Fitzhugh Green, U. S. Navy....2455

THE NAVY YARD SPIRIT. By Naval Constructor C. W. Fisher, U. S. Navy....2495

WHAT HAPPENS IN AN AUDION. By Lieutenant J. B. Will, U. S. Navy.2505

AMUSING FIFTY THOUSAND MEN. Another Opportunity for Government Control. By Lieutenant Fitzhugh Green, U. S. Navy....2527

ALTITUDE, AZIMUTH AND HOUR-ANGLE DIAGRAM. By G. W. Littlehales.2541

AN INSTANTANEOUS DEAD RECKONER. By Lieutenant Alfred G. Zimermann, U. S. Navy....2547

THE MOON IN NAVIGATION. By Commander H. G. Sparrow, U. S. Navy.2553

NOTES ON SHIP HANDLING. A Method of Finding the Course from One Relative Position to Another, Knowing the Course and Speed of the Guide, Using Martin's Mooring Board. By Captain G. H. Burrage, U. S. Navy....2555

COURSE IN MARINE ENGINEERING FOR RESERVE OFFICERS. By Commander G. J. Meyers, U. S. Navy....2563

DISCUSSION....2577

MINUTES OF THE ANNUAL MEETING, 1917....2578

SECRETARY'S NOTES....2588

PROFESSIONAL NOTES....2593

INTERNATIONAL NOTES: NAVAL WAR NOTES....2699

INTERNATIONAL NOTES: DIPLOMATIC NOTES....2762

REVIEW OF BOOKS....2777

INFORMATION INDEX....2592

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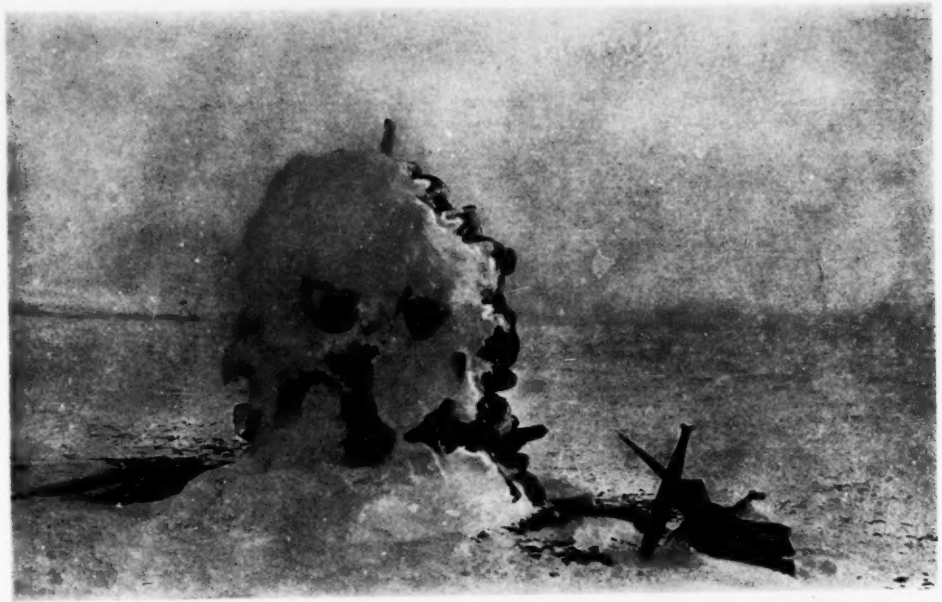

PEARY'S CAIRN AT CAPE THOMAS HUBBARD

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ARCTIC DUTY

WITH THE

CROCKER LAND EXPEDITION

(CONTINUED)

By LIEUTENANT FITZHUGH GREEN, U. S. Navy

DRIFT ICE AND KAYAK

Every sense has its pleasurable side. Sight loves beauty. Hearing revels in music. For touch there is sensuous softness and smoothness. Taste may run the gamut of all edibles. When life has been unkind, has conspired to deprive us of every joy, our souls hunger for the tickling of any or all the senses as our bodies might crave food.

Have you ever waked suddenly in the night and found yourself listening? Silent darkness gives you no walls, no horizon, only infinite deathlike space through which you listen tensely. Every nerve is on edge. Every half-stifled breath is grudged; and heart beats seem hammer loud. Ears suffocate for want of sound.

Suddenly in the distance a bell strikes. It is only the clock marking a step toward to-morrow's troubles. But to your strained desire the pealing note is marvellously clear and beautiful. In the gratification of your longing for sound all that matters is the sound; and you dwell upon it, cling to its dying vibrations with voluptuous greediness.

To the Polar Sea and on it life had shown us only cruelty. No opportunity did fortune miss to crush from our days the very essence of joy. We told ourselves the blue sky was lovely, but the wind blinded us as we looked. Now and then we sang to prove our spirits were still strong—the words fell hoarse and without music from our blistered lips. We talked of food, almost always of food. But so far away it seemed to enough food that discussion of it only tantalized us. We longed for food, for rest, for recreation. But above all our souls were tense as though in a darkness of joyless existence, waiting, straining—craving a bit of happiness, a morsel of content, an infinitesimal particle of satisfaction.

When I fired at Peewahtoq there were no echoes. Sound seemed muffled by the drift. As I stood there with empty, smoking rifle in my hand something of that gratification of sense held me. At last I tasted of pleasure for which I starved. A moment before I had faced the end of everything. Now I beheld the beginning. I had seen dogs, clothing, fuel, food, vanishing in the gloom ahead. Here they were—mine to keep, to drive, to wear, to burn, to eat. He that had loomed hostile and a deceit between me and safety lay now crumpled and inert in the unheeding snow.

For once fate was balked. I gloated over my victory, not the man—he like myself was but a pawn in this game of the gods. But I feasted on the thought that fate had played to lose the piece which, measured by all man's standards, was of the two the more finished and mature. I had baffled misfortune. The feeling sent red gladness to my anæmic humor, feeble in the accumulated gloom of eight aching weeks.

A pocket in the storm permitted snow to fall gently. The blustering wind withdrew to cliffs and pinnacles hidden in the veil of the blizzard. Perilous uncertainty lay before me. Certain danger lay behind. But the present was perfect, ecstatic. To prolong the moment was my impulse. I laughed, not fiendishly, but because I was glad. Then the mood passed. I went over to the Eskimo.

He lay face downward, unmoving, in the snow. The dogs, which had stopped at the cessation of whip and shout, stretched their traces toward me. They whined as the scent of fresh blood, human blood, excited in them a strange mixture of fear and passionate retching of their pinched stomachs.

The king barked sharply and sprang against his chest strap. The team jumped with him. In a moment they would have been upon the body. Man-like I resented the brute threat and by a furious onslaught with the whip drove them cowering to their places.

Action seemed to startle me out of the strange state of mind, almost lethargy, into which the sad affair had stunned me. If Peewahtoq were alive I must do something at once to save him. Blood on the hood of his *kooletar* meant a head wound; and absence of pulse left little hope. But my object was not to take his life but to preserve my own. My duty now was to him.

Not without tenderness I hove the body atop my load and lashed it. The wind was increasing again but in the lull I had recognized a ledge of black rock which I knew was not many miles from our igloo at the cape. By feeling my way along the ice-foot I might reach the gravel tongue marking Peary's discovery. The dogs did poorly with their new master whose lash cut but could not lacerate in the painful way to which they were accustomed. Perhaps they knew we were going back, for even when I lost the trail and all sense of direction they seemed ever willing to try another tack along the wind.

When I thought I must have reached the vicinity of the old camp I anchored the sledge and set out in a circle to find the igloo. So much snow driving had forced me frequently to take off my glasses. Now I felt a touch of snow blindness coming on. My throat was parched and my feet felt puffed and shrivelled like the edges of a fried egg.

I don't know how long I wandered about. At last I stumbled on the house looming like a domed sepulcher through the scud. Drift had worn great holes through its sides and nearly filled the interior. With my snow knife I patched and rebuilt the walls and cleared out enough snow to make it habitable. Lest the dogs escape on some wild hunt I double hitched the leading trace and went over all harnesses. It may seem that the native should have come first; but in driving snow without shelter, and while precious dogs may get away, nothing else can be so vital. I dragged him in. The effort cost me my feeble reserve of strength. His limbs were already stiffening. Too weary to put him outside again I plugged the door, shutting out the hideous, pitiless, nerve-destroying wind. Alone with what was left of my party I tended

feet and fingers and ate a little dog pemmican. The stove refused to burn, and I was half glad for my meager supply of oil warranted no celebrations. I remember I kept wanting to say, "Peewahtoq, you lucky dog, it's all over for you. For me it's hundreds of miles of hell, with all the pain and misery of hell, and not one degree of its heat!" But I wouldn't let myself say it. I was afraid of being afraid.

I spread my mangy bit of sealskin on the igloo's white floor. Sitting down I threw a spare shirt across my feet and drew my arms inside its sleeves. My overtaxed muscles succumbed to terrible arctic drowsiness which so far I had resolutely thrust aside lest I be caught unsheltered.

I dreamed. Harassed life of wind and dogs and ice fell away like a cloak, leaving me free to roam in warm sunshine, refreshed by the pungent fragrance of aromatic pines. It was the same dream—almost every night it came: A little valley surrounded by hills and trees and blue sky; laurel everywhere. In one spot, marked by a cluster of white lilacs in full bloom, was a door half open. Within just out of reach were shelves and tables loaded with huge cakes and roasts and whole cauldrons of rich broth. Standing there was a fat old baker I had known and visited daily as a schoolboy. He would smile and invite me in. And then—oh, cruel fancy—he would turn into an Eskimo and say, "Sinnepah tima" (wake up)!

I awoke. For a moment I thought we were still on the sea ice. I glanced across to where the next man should have been. A horrible sight met my eyes. Warmth of Peewahtoq's head had melted snow underneath until he nodded my way. His eyes were open, glaring and malignant, fixed upon me.

Unable to endure the dead man's silent loathing I rose in a kind of stiff haste and kicked out the door. I seized his wooden shoulders, dragged him without, and hid the body behind an iceberg. Perhaps the wolves and foxes did not find it for several days. Made little difference. . . . .

All of which seems gruesome here, with food and warmth and friendship. But I do not write to boast morbid delight in a truly sorrowful experience. I wish rather to illustrate how little removed we are from the creatures we despise. Grip a man's heart and his reactions are inarticulate protests against the unseen force which throttles him. Let the right combination of circum-

stances, edged by the pitiless elements, cut a man to the quick and he will turn savage by the very logic he once boasted was his certificate of culture. In war, whether against man or against fate, a man must be measured not by his acts but by his motives—which are his thoughts.

> "Men should be judged not by their tint of skin,
> The gods they worship, the vintage that they drink;
> Not by the way they love, nor fight, nor sin—
> But by the quality of thought they think."

I made a little tea and concentrated on my predicament. I had at least four days' supply of bread, hard biscuits, which I reckoned by piling the broken bits into little heaps. Two tins of dog pemmican might be eked out to serve team and me for nearly as long. Of oil there was so little I forbore to measure it.

It was May 2, I remembered, and MacMillan was due to meet me at our cache between 30 and 40 miles east. But the blizzard seemed disposed to continue forever. To a weak and famished man 40 miles may well seem 400.

Another thing was important. I must secure Peary's other record on the cape. Twice I started but each time the drift discouraged me before I had progressed very far. I thought the distance only a mile, but when I finally reached the cairn nearly 5 miles of drift and wind-swept gravel lay between me and the igloo.

I found the paper in a saccharine bottle. It read:

JUNE 30, 1906.

Arrived here noon June 27 from the Peary Arctic Club's steamship *Roosevelt*, which wintered off C. Sheridan, Grant Land.

Killed two deer within half an hour of landing and secured eleven in all. The 27th and 28th fine clear days giving good view of the northern horizon from the summit of the Cape. The 29th and 30th southwesterly gales with rain and snow.

Have with me 2 eskimos and 12 dogs. Expect to start back tonight.

R. E. PEARY, U. S. N.

I left Peewahtoq's *teeduktoq* (snow-stick) and a pick head on top the rock pile. Inside I placed a brief account of our trip enclosed in a water-proof match-box which I wrapped in a small grass bag. Not many years will elapse before a third man guides his swooping skyplane to that lonely spot. I wish him better weather than we had. . . . .

On returning to the igloo I fed half a tin of pemmican to the dogs. I was really more concerned in making friends with the ugly brutes than in filling the hollows between their scrawny ribs. I saw the shoulder strap of one was torn loose. Fetching the only spare harness I had I made as if to exchange it for the broken one. The wearer was a vicious little female of the species. While my hand descended her lip curled. As I touched her she snapped. The white fangs cut clean through my mitten and into my hand. I tried to grip the scruff of her neck but stumbled and fell to my knees. Instantly a vise closed on my arm.

The team had been dozing. Now they faced me bristling, tense and ready to leap, the cowards! the moment my disadvantage was certain. I saw again the hunger lust I had seen when they went for the Eskimo's body. Again all the alien animal in me foamed up and burst. With the strength of madness I twisted my arm clear. I seized the bitch by her throat and hind quarters. Drawing to my full height I lifted her over my head and hurled her into the king's face—a slight *lése majesté,* I should say.

Before she could recover they were upon her. I snatched my oak *teeduktoq* and hammered unmercifully upon the cluster of snarling heads. Into the blows I put every ounce of wrath and fury I had. Two dogs staggered away. The powerful king fled howling to the end of his trace. The remaining ones dodged about in terror criss-crossing their traces around my legs. I slipped the queen's harness and dragged her clear. She was dead. But her flesh was hot. I got my knife and cut her up—to windward, that my murderous hell-hounds might suffer in the tantalizing odor of fresh meat.

I felt weak and dizzy after the exertion. Tears rolled down my cheeks. As a little food seemed a good plan I drew parsimoniously upon my fund of biscuits. Imagine my joy to discover one on which lay a film of condensed milk like icing on a cake. For weeks my whole body had cried aloud for sweets. I found two more similarly crusted, and in the corner of the tin a flaky spot which I chopped out and licked clean. Then I remembered we had lost half a tin of milk some days before. It must have overturned in the biscuit box.

Food proved a good stimulant. I stood up and peered through the igloo's peep-hole. The team were sitting about licking injuries

received in the late engagement. I put my mouth to the hole and in pithy terms told them just what I thought of them.

After a nap I went out again and was delighted to find the weather clearing. Heavy mist still hung over the sea ice—what could make it so black? Then I saw it was no longer ice. Three days before Peewahtoq had kept repeating something about the devil and the wind and the ice, which I did not understand until this moment. The gale had torn loose the heavy pack. Between me and the distant floes lay a Stygian river of inky blackness, a wide lane of open water stretching east and west as far as I could see. Thirty-six hours longer on the Polar Sea and we should never have returned. Such a break-up could not freeze again so late in the year. Something—Someone then was on our side.

Once more in the night I rationed out a few shreds of pemmican to the miserable dogs. The sledge had already been sawed short for lightness and my little package of belongings added but a few pounds. Gusts of the dying gale assailed me as I hitched up the team but I felt forced to make haste in any weather rather than miss MacMillan.

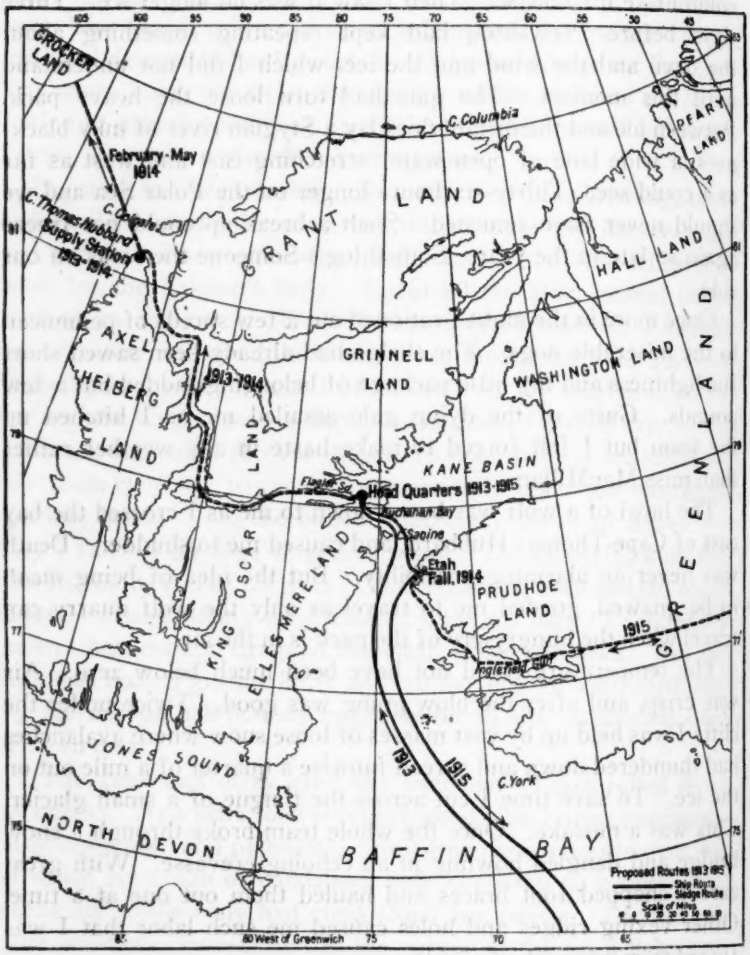
The howl of a wolf was borne down to me as I crossed the bay east of Cape Thomas Hubbard, and caused me to shudder. Death was never an alarming possibility. But the idea of being *meat*, to be gnawed, goaded me to travel as only the wolf quarry can travel when the hungry-cry of the pack is in the air.

The temperature could not have been much below zero. Air was crisp, and after the blow going was good. Twice under the cliffs I was held up by vast masses of loose snow where avalanches had thundered down and spread fanwise a quarter of a mile out on the ice. To save time I cut across the tongue of a small glacier. This was a mistake. Once the whole team broke through a snow bridge and dangled howling in an echoing crevasse. With great care I chopped foot braces and hauled them out one at a time. Other vexing ridges and holes caused me such labor that I was forced to camp on the far side.

While I slept two dogs gnawed loose. All of course had had their back teeth knocked out as puppies, but continual hungry mouthing of the worn sealskin traces eventually softened and wore them through. Before I could catch the miscreants they had devoured one of my spare mittens and half my last whiplash.

They were so weak that I was afraid to punish them as they deserved.

The sun was in the west when I started again. All night I



FIELD ROUTES PLANNED FOR THE CROCKER LAND EXPEDITION

plugged along in company with the great red orb which painted the snow and ice and cliffs such beautiful colors, but gave so little warmth to my weary body.

It must have been about noon the next day when I rounded the last cape before our cache. MacMillan writes: "On the morning of the 4th (May) I began to worry over the continued absence of Green and Peewahtoq. Six days had elapsed and I had given them only three days' food. Where could they be and what could have happened? So constantly did I watch that point to the north throughout the day that the picture is still in my mind—the broken ice, the sloping shore, the high bluff, the white hill. Late in the afternoon a black dot on the horizon was seen—something was coming. As the dot approached and the distance in the rear widened I could contain myself no longer. The sledge coming was Peewahtoq's. Where was Green?

"I ran along the ice-foot to meet the sledge. Yes, they were Peewahtoq's dogs. As the question, 'Where's Green?' was about to burst from my lips the driver whose eyes were covered with large metal glasses, seemed to turn suddenly into a strange likeness of Green. He looked as if he had risen from the grave. 'This is all there is left of your southern division,' he said.

"'What do you mean—Peewahtoq dead? Your dogs and sledge gone?' I inquired.

"'Yes, Peewahtoq is dead; his dogs were buried alive, his sledge is under the snow 40 miles away.'"

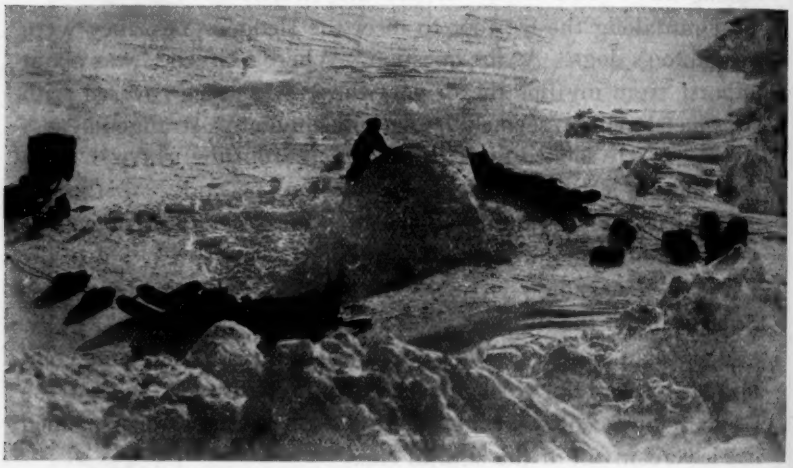
MacMillan and Etukeshuk outdid themselves to make me comfortable. From our caribou cache they brought meat and a fresh head. I topped off a pemmican stew with frozen brains spooned like ice cream out of the natural cup.

"How about going on," MacMillan asked me. "Do you feel as if you could make it?" He gave me a searching look. "It's getting late. The glacier will soon be bad, slippery under the high suns. You remember what a time we had getting up."

Of course I assented. I was tired but felt much better now that I had a good feed under my belt. My load was taken by the others so that I could cat-nap while riding on the *komotik*. Etukeshuk broke trail at a great pace. No attempt was made to describe the truth of Peewahtoq's disappearance, and probably the younger man concluded that the sooner out of this scrape the better. Although the average Eskimo's imagination is rather an inelastic piece of mechanism I have no doubt that our man had some anxious musings as he trudged the slow miles homeward.

We passed one of our up-bound igloos out of sight in the drift except for a sledge which had been abandoned there. At the first turn beyond we were interested in seeing for the first time the snowy lowlands which rise in abrupt steps up to the ice covered inland plateaus and mountains. On our upward journey storm and drift had completely obscured this coast. Now our curiosity was gratified by a perfect view of the white ranges of Axel Heiberg Land. This portion was discovered by Sverdrup in 1901 but seen and coasted for the first time by ourselves.

A faint shout roused me. I straightened up in time to see Etukeshuk double back on his trail and dash in a zigzag line



PEEWAHTOQ FINISHING SNOW IGLOO ON POLAR SEA

through the shore hummocks and up on the easy slope beyond. There stood the coveted game, six arctic caribou—still, gray shadows outlined against the sky. They were a little timid at our noisy wolves but inquisitive enough to await developments.

The Eskimo stopped his runaways by capsizing his sledge. MacMillan and I pulled up alongside. Wind was in our favor and we came close. At the first volley two of the animals fell. Another sank bleeding just over the ridge, and two more plunged heavily into a snow bank filling a little gully just beyond.

There was nothing to do but camp. I don't believe we debated the question, or even mentioned it. We just dropped everything and squatted. Etukeshuk built a cosy igloo while we brought

in the carcasses. Our dogs acted like lunatics tearing at the warm meat or rioting among themselves when we broke through the mob. Each team had a whole caribou to itself. Two we butchered for our own feast, picking off the tenderloins and other tidbits. The heads of all were saved for their tongues and brains, delicacies of which we often dreamed while on the Polar Sea.

We didn't wait for tea but as soon as the water was boiling threw in our choicest cuts. The native could not wait but gorged himself at once with the raw hot flesh. We also staved off the worst pangs in a like manner while drooling about the fragrant pot. After 10 or 15 minutes we dug in. We didn't talk much. We simply ate and toppled over like drunken men. My last hazy recollections were of a mighty uproar outside where our teams fought to their heart's content, delighted most likely to find that now they had strength to settle up old scores in a properly lacerating manner.

As usual after a barbacue we as well as the dogs were logy next morning. The Gordian knot was a lover's bow compared to the inconceivable snarls we found in our traces. Etukeshuk's team had bound themselves to a skeleton so tightly that one had to sleep bottom up and two could not lie down, but sat dozing in blinky sulkiness at the mess.

A stiff wind added to the discomfort of getting underway. It swept down Nansen Sound in a strong free movement later to be congested to a steady gale where Axel Heiberg Land bent eastward at Schei Island and narrowed into the white funnel of Eureka Sound.

But the blast was with us now. We lashed snowshoes to our upstanders and set skin sails to the improvised spars. To encourage the teams we cut tufts of hair from the caribou skins and let the wind carry them hopping and dancing before the galloping dogs. In crazy swoops we sped southward, steering by the white summit of Hvitberg which loomed through the drift.

We covered a long march and made Schei Island where we found the first vestiges of the two boys who had left us nearly a month before. They had sawed off their sledge, rather had hacked it short with a snow knife, and stuck the fragment up to mark our musk-ox cache.

While we were feeding the dogs Etukeshuk scanned the hills for signs of life. An exclamation of delight escaped him. We

followed his gaze to the southwest and saw near the shore a cluster of black dots like fleas on a white sheet. There must have been a hundred musk-oxen divided into several herds. But we had enough meat now and it was more a question of speed with weak dogs than of stopping for a kill.

I was not disappointed. Killing musk-ox is a pleasure for the appetite the meat will satisfy, for the savage beauty of the environment, and for the lively tactics of the dogs and herd. Shooting them simply is butchery for food. We never did unless we actually needed the meat.

When musk-oxen are sighted the custom is to drop loads and circle to leeward. At some distance several good dogs are loosed. The herd immediately forms to repel wolves. Bulls range in a line or circle facing the enemy. Cows and calves stand shiveringly behind their protectors. A dog darts in and is met by the nearest bull snorting and tossing his huge curling horns. An inexperienced dog does not suspect the agility of his bulky adversary. I have seen a dog impaled and thrown end over end to gasp out his last gurgling breath yards away. It is not unusual for an Eskimo to go through his team after a kill and tuck in intestines here and there ready for sewing up those dogs most likely to recover. Nucarpingwah told me that once by mistake he sewed another dog's stomach into his king dog's abdomen. The king now of course has double the appetite of any other member of the team. I can vouch for the appetite. That he has two stomachs I cannot prove but think it not entirely improbable after having seen a gastro-interostomy (removal of the stomach) performed on a human being infinitely more tender than an Eskimo dog.

Poor Etukeshuk! He ached to go over there and massacre. When meat is in sight the native has no more judgment than the dog he drives. Had we all been Eskimos we should have attacked those herds without delay. We should have skinned and butchered and gorged both ourselves and our teams until we could hold no more. We should have slept 20 hours and done it again. Bad weather would have come and we should have lain stormbound and feasted greedily some more. Finally, storm and appetite and meat having vanished, a week in all perhaps, we might proceed to the glacier and find it impassable. Perhaps a few days' food would be left and a bare covering of ragged garments. But that would make no difference. We should simply find a suitable

spot and spend a year there waiting until the next spring made getting home possible.

If you, my reader, could only see that silent bleakness and snowy desolation, so treeless, lone, cold, and white, you would never believe me—that men could be dropped there with neither food, arms, nor apparel, and still survive. But a month later you would find a jolly party wallowing in rank seal and slimy blubber, romping like children, and counting the days a picnic which their friends would envy. Etukeshuk and Ahwelah were caught this way five years before and lived high on musk-ox and bear which were lassoed with walrus lines and choked to death. I have with my own eyes seen a bear killed in this manner when ammunition was scarce.

May 7 and 8 we covered something like 75 miles down the sound. One of my dogs had not picked up as he should have on the meat. I loosed him in the afternoon and saved his ration out when I fed the others. Later he staggered into camp but refused to eat. His weakness was touching. "Poor old fellow," I said to him, rubbing his ears. "We're going home. It's almost over. Can't you stick it out?" Turning his head up to me I added, "I'll let you run free. You won't have to pull. I'll even let you ride sometimes."

His eyes were blank. His tail, bedraggled and rotted by frost ulcers, hung limp. Through too many cruel days had he toiled, and too many bitter nights had stolen sleep from his shivering gauntness. His body yet lived but his spirit was dead. His dull eyes and drooping head were mute assurances of his longing for the end.

I again gave him food. He only turned his head away. When we started I tried to coax him to follow. He sat up weakly and watched us out of sight.

Up among the rocks another dog also watched us out of sight—the original dog. When shout and yelp had died away he descended to the ice. Perhaps he circled and snarled a challenge to the craven wretch we had left like a bit of refuse from our camp. He glided close warily. Then snarling he struck. And he fed upon my dog, which at the cape had eaten its share of Nucarpingwah's dog, which on the ice-cap had in its turn gnawed clean the bones of Etukeshuk's dog, which . . . . and so on through the whole story to the original protoplasmic cannibal,

toothless, even gumless, and manifestly without aim—yet in truth so purposeful that I, his lineal descendant, have power to reason and to record a fragment of his jellified life.

Thereafter we travelled by night; not in darkness, but while the sun swung low in the north. Noontime temperatures above zero gave soft going; and during the high sun was our best drying times for footgear and soaking shirts. The wind on which I have expended most of my literary ability was our greatest irritation even in this warm weather. Temperature alone was not an acute factor in our discomfort. To be sure some of the spirit thermometers registered to 80° below zero. Amundsen reported 79° below in March 500 miles south of us. And Sverdrup in his diary implies even more intense cold.. But cold to us was the measure of the blast which gouged skin off our noses and cheeks, and pried frightful language from our Christian lips. Cold by itself was a moral outcast with whom we consorted only by chance and without intercourse, save when evil demons of the tempest drove her wickedness into our flesh like sharp prongs leaving festering sores to remind us of the meeting.

When we first started back we had been able to use the old igloos. Now we found them sunken in until the top almost touched the bed platform. Strange to say they did not crack but collapsed in a viscuous way as if made of dough. In the previous month I had saved weight by caching several pairs of mittens and *kamaks,* lashing them to the igloo roof by a line through to a stick outside. This was always an occasion of great merriment between my two boys who assured me I was only feeding the wolves. But in my stubborn ignorance of inexperience I held that no dog could jump 6 feet into the air. My cocksureness didn't pay. Only once did I find a trace of the things I had left. The marauder had not deigned to swallow a pink draw string I had in one *kamik.*

Without igloo, tent, or sleeping bag we made ourselves as comfortable as possible by sleeping on the sledges. A snow-block windbreak was usually put up, but more often only made matters worse by the drift it caused.

With great relief we finally swung out of Hurricane Gulch, as we nicknamed Eureka Sound, and turned up Bay Fiord. To our dismay the snow was several times deeper than when we had come down. Incidentally my snowshoes were under the drift

with Peewahtoq's sledge. The only thing that saved me was the length of my legs. While the sledge and dogs wallowed and floated on the poorly crusted surface, I sank at each step nearly to my crotch. It took me an hour to make the last mile.

We camped near the "Coal Mine," as we called a seam of tolerably black bituminous mixture which shredded through the limestone near a small stream of ice. Etukeshuk was familiar with the spot, having spent some time there with his father Panikpat, his mother, and several others.

The place, he said, had not been well-suited for an igloo, and there was a lack of fresh-water ice. But to their surprise and joy they found some of the black rock with which Peary used to cook and to make his enormous ships swim with the speed of a frightened narwhal.

Straightway the young man collected a sealskin full of the coal and brought it to the igloo. By arranging some flat rocks and with the help of a little blubber a small hot fire was started. At first the smoke was an evil thing, but a hole in the top of the igloo soon drew it out. Just as all were settled the dogs started a bear. After the rush only the old mother was left in the igloo. The bear proved to be exceedingly long-legged and ran faster than a bear is wont to run. He escaped. All returned disheartened. The igloo was very still. Did the old mother sleep? Shouts did not awaken her. Madly Panikpat smashed in the snow door. His wife was dead. The almighty devil had sent the swift bear to lure all away, and then had slain the helpless woman. "And so skillful was his work, no mark left he upon her."

I suspected the truth. "Did she not close up the igloo tightly," I inquired, "door and top-hole both?"

"To be sure, for she was of many winters, and not easily warm."

Whereupon I put a crimp in the almighty devil's reputation by explaining to Etukeshuk that anyone shut up in a tight igloo with a coal fire will go out like a match in a gale. He heard me through with customary stolidity.

However heart-broken Panikpat may have been the business of living must go on and I subsequently learned from Weevik that a month later Panikpat took Ahtuksungwaq to grace his home. A sight of the lady, she was afterwards my seamstress, was proof that he consulted his welfare and not his taste in making the choice.

I scraped around in the snow for some good specimens of coal for our collections. Involuntarily my thoughts slipped backward over the ages to the trees and ferns which once flourished on these same ice-worn banks. I tried to imagine what humiliation the luxuriant growths might feel did they but know how soon their green profusion had been metamorphosed to shrunken, colorless globules appearing in the snowy ravine like so many prunes in an ice-box. More fascinating was contemplation of possible causes which arrested tropical climates not only in the Arctic but in the Antarctic where coal seams have also been found.

AHTUKSUNGWAQ, PANIKPAT'S WIFE, CHEWING BOOT SOLE TO SOFTEN IT

It may be that oscillation of the earth's axis placed the original poles somewhere in those southerly areas known to have suffered by glacial inundation—Europe for instance, Canada, and our northern states. A discouraging theory though, for it leads one to fancy that some future Peary shall with indomitable persistence struggle to the summit of a Meta-tautean Pole at or about the present location of Times Square. Infinitely more satisfactory is it to resuscitate the legend that arctic oases exist, spots warmed and nourished by subterranean fires, which thaw the eternal snows to fires; upon whose banks chance sows the seed of strange flora and fauna, developing, flowering, then feeding some fortunate

outcast who becomes the father of a race. The story of such a race—its wealth, its gradual fading and decay as the fires grow less, then final freezing—epitomizes the epic of our own race upon its dying planet.

A dog fight interrupted my reverie and the lump of coal went hurtling away carrying with it the nucleus of my cosmic fantasy.

Let me add that at Disco Dr. Porsild, the Danish botanist, led me to a hot spring which bubbles from the basalt. In full view of bergs and glaciers I witnessed orchids and maiden-hair ferns hugging their source of heat in cosy security. Through the winter, I was told, the snow drifts up yards deep. But steam from the spring hollows a dome-shaped enclosure making a perfect hot-house and preserving the delicate plants through eight cold, dark months.

From the coal camp it took us 17 hours to reach our cache at the head of Bay Fiord. The last 5 miles were done at a snail's pace through snow waist-deep in places. But our reward was great. For many days we had been without biscuit. Our bodies craved carbohydrates. We reached the glacial meadow about one in the afternoon. With sunshine and no wind, plenty of musk-ox skins, and all the biscuit we could eat, we slept steadily until the following afternoon—except that from time to time we awoke and ate another biscuit.

About 6 p. m. we got underway in a leisurely manner and began our last struggle over the ice-cap. Though a light snow was falling we laid our course by the ravine 2 miles south of the glacier. This course enabled us to reach the upper ice-cap without cutting steps. On our first crossing the Eskimos had gone astray and we had been forced to lower everything 200 feet down a precipitous ice face.

The crossing took two and a half days, and was without incident except that I lost another dog. We were almost over when MacMillan decided to give the teams a good feed. I divided my pemmican in big lumps, one for each dog, performing the operation in front of them. An Eskimo dog's table manners are not of the best. As usual the animals strained at their leashes. They howled and shivered and drooled, and from time to time sprang towards the feast. Ice was not so tough now as in the cold weather. Suddenly the nubble gave away. I was bowled over by the rush. Etukeshuk chortled with glee, then cried out, "Look!

the black dog chokes." My strongest end lay on his side in convulsions. One of the lumps of pemmican was in his throat.

The Eskimo jumped for his whipstock and using it for a pry tried to dislodge the piece. With great presence of mind I recalled my early days in medical school. I whipped out my knife and kneeling on the dog's stomach performed a hasty tracheotomy, *i. e.*, opened his windpipe and inserted a wedge. Meanwhile the rest of the team having gobbled their pemmican set upon the victim's hindquarters. They probably concluded that Etukeshuk and I were contenting ourselves with upper portions and determined to have their share of what was left. Needless to say the poor wretch died. I recorded in my diary not that he choked to death but that his heart's failure came by fright upon having been suddenly set upon by two strong men and five vicious dogs.

At the bottom of the glacier we had our first taste of luxury. Ek had thoughtfully left a tin of sweet chocolate and some milk. We each ate a whole can of milk, dipping out the thick, sweet mess and smacking our lips over its deliciousness. We had often declared that no less than three cans at a sitting would be our limit. To our great disappointment we found that one can of such rich food was all that we could manage. I well remember the tingling sensation in my jaws and the wetness of my tongue on opening the first can.

Two marches farther on we reached our big cache in Hayes Sound. Only a little mouldy biscuit was to be found, Dr. Hunt having returned in April and set everything ashore. Six hours of plowing about in the heavy, sticky snow passed before we found the pile of cases. We gorged, and the dogs gorged. Then we slept. But the teams fought and vomited, and fought again. I think half their joy in food came from the strength it gave them to fight.

The 60 miles from here to Cape Sabine were full of wind and heavy going. We were all more or less snow blind, and the dogs were half sick from the change of diet. We were still forced to conserve our supplies until sure of crossing Smith Sound.

May 20 was a red-letter day. Uvdloriark and Acpuddyshao met us at Pim Island. A note from Etah reported all well. Finally a box of jam and canned fruit with plenty of biscuit and tinned meat completed the joy of our return. The dogs were not forgotten. A fine, fat, rotten hunk of walrus meat was appor-

tioned among the teams, who immediately outdid all former records in the violence of their ensuing riots. For once MacMillan lost his patience. I photographed him out of his sleeping bag—just out—clad in the rags of a union suit, grimy, bearded, and full of wrath, as he brandished a long *teeduktoq* over the unscrupulous knaves and delivered himself of some fine and furious oratory, which was of course lost in the uproar.

Next morning we reached Etah. That home coming was enough to inspire poetry in the breast of a stone wall. It surpassed the bliss of heaven, marriage, or a raise in pay. In three months we had travelled 1300 miles on pemmican, tea and biscuit. Remorseless routine of work and sleep, plod-plod-plod, with a tiny ration night and morning, had chained us like some terrible sentence which in the end must consume our aching bodies as they strove so painfully to keep up. No diversion but the elements, no recreation save our toil; while cold, hunger and filth branded our every thought with hatred.

Then to wash with sweet soap; to eat cosily and in peace; to chat and laugh and play at games; to choose a familiar volume from the shelf and settle in a quiet corner; to yawn, strip and snuggle down among rough, warm blankets and sleep unbrokenly for hours—no dogs to tend, no numb feet to beat, vast possibilities for rolling and stretching . . . . the very rapture of it all was worth the price we had paid. In a week we were like a pair of fatted pigs.

The arctic summer is short, but since the sun does not set for four months the days are doubly long. The extreme cold breaks about the middle of April, but not until late June does the summer average of 25° to 35° Fahr. set in. Great quantities of snow disappear long before melting temperatures are reached. It is probably this evaporation and the latent heat of liquefaction that pilfers the warmth of spring sunshine. Frequently in April our noses blistered from the sun on one side while the other was shrivelling from frost-bite.

Immediately after our return I checked up my meridian marks by a long series of observations. After the chronometers were corrected final reworkings gave us very exact positions for our Polar Sea sights. To our satisfaction astronomical data placed the farthest camp at 82° 30′ north and 108° 22.5′ west, or a little beyond our conservative dead reckoning.

A theodolite magnetometer proved to be more useful than our miner's transits. It was loaned us by the Carnegie Institute in Washington, D. C., for my work in terrestrial magnetism, in which they had kindly given me a course of instruction. I followed the Institute methods, based on coast and geodetic forms (see C. & G. S. Instructions for Observers), with a few refinements in formulæ when checking on long series. I reoccupied the magnetic station marked by Professor Craft in 1909 at Reindeer Point (our Provision Point) and found the declination (variation) of 104° westerly to have remained approximately the same. Greely and Kane did excellent secular change work in these regions. Had we been less pressed for time valuable supplementaries might have been secured at our camp. I can recommend the declinometer and dip circle as healthful forms of outdoor solitaire. But one's demeanor in their presence must be too constrained for hearty spirits. Thus may the ripe ardor of youth sublimate to the scaly gloom of the scientist. Cold fingers become a powerful factor in an explorer's point of view.

I should like to live my last days in the crisp, rich beauty of an arctic summer. Such clean, wide lines the land has; such white expanse the blue-edged ice; and the sky a fathomless azure heaven bordered by the white and green ribboned cliffs of red rock, except where flashing torrents plunge over them to misty wells below. Birds twinkling, fluttering, chattering everywhere, filling the crystal air and the water. Darting blue foxes play tag through the hummocks. Lazy mating seals roll heavily on the sun-eaten floes. Snorting walrus and narwhal play and dive where the tide swings under the ice-foot.

We anticipated the eider duck eggs by establishing a camp at the rookery on Littleton Island several days ahead of time. Two days after the first nest filled we started to collect. In all we took about 6000 eggs for our next winter's supply. An eider egg is nearly twice as large as that of the hen. Though very fishy it is in the same class with other arctic foods, all of which must be practiced upon before one finds them palatable or even endurable. We followed the native method of caching our eggs in piles under rocks where they keep very well. Some we put up in salt spoiled. Not that it made very much difference to our boarders, for an Eskimo hunts in the pot for an egg with a duckling in it

with much the same gusto that a small boy plows through the candy box for a piece " with a nut in it."

The stay at Littleton Island was an orgy of eggs, raw, boiled, fried and every other way. On the first day we simply fell to our knees before a nest and sucked the fresh yolks like starving animals. Fact was we were starving for something of the kind. Fearing to frighten the ducks away we did not shoot them but used Eskimo snares. And Greely's 19 men starved to death within 26 miles of the spot!

On our return we built with native help several kayaks or skin boats. These craft average about 15 feet in length with 18 inches beam. Their depth sheers from 8 inches at the bow to 4 inches at the stern. They are simply light skeleton frameworks over which wet scraped sealskins are sewed. Subsequent drying tightens and water-proofs the skins. An average kayak weighs 50 pounds. A small hole in the center barely permits the legs to enter, and since there is no support for the back kayak travel is very cramping. However, we soon became rather adept in their use. MacMillan and Hunt each secured a full-grown walrus from a kayak and I managed to harpoon two hooded seals, each weighing 600 or 700 pounds. Ducks, gulls and seals were our steady prey, as in a kayak we could creep up on them without being seen or heard.

About July 1 MacMillan detailed me to take the whaleboat across Smith Sound for two weeks of walrus and narwhal hunting. The meat was to be laid up for use in the next spring's campaign. My party consisted of four hunters and Etukeshuk's wife, Ahlneah, who came along to sew and dry our clothes. She was given to *pibloktoq,* but her fits proved rather a diversion after a long hunt. Another party of natives followed us in an old boat which Peary left in 1909.

The first night we made Anoritok and camped on the rocks. Rain and snow soon put a stop to hunting. I had one tent 6 feet square. Without invitation or even warning the entire lot prepared to spend the night with me—seven men, two women and a boy! We sucked raw eggs for supper and made tea for the crowd. Sleeping was solved by arranging ourselves end to end around the tent like a coil of human rope. The boy and the two women being the shortest and most pliable occupied the center. I and the three longest men curled around the outside edges.

Five of the party snored; Inalooq talked in her sleep, and Sipsu was sick from too many eggs. But we were warm and dry and not hungry, so there was no complaining.

Next afternoon in clearing weather we struck camp, dumped our gear in the boat, and set sail. Our old friend, the north wind, whisked us along as we skirted the sound pack. Sighting a herd of walrus about 12 miles out we landed on the ice and put up

ANINGARK, ONE OF OUR BEST NEEDLEWOMEN

the tent. By means of the kayaks we had brought two walrus were quickly harpooned. Giving chase in the boat we came within rifle shot and were soon towing over a ton of good meat to camp.

We celebrated our luck with the usual gluttony interspersed by occasional harpoon and jumping games, which of course enabled us to eat that much more. We snared several ivory gulls in the snow and topped off the feast with a stew. Later I grew more fond of these sea scavengers, but at that time found them a little beyond my capacity for strong meat.

We slept without a watch. Once I was aroused by the tent slatting in the wind but dozed off again. A shout brought my head out. "The ice is destroyed—save the boat!" Someone ran by. I jumped up knocking over the pot of greasy water, which spread through the pages of "Les Miserables" which I had laid down the night before. "White man, quick! you—" A squall swept the voice away to a remote distance. I heard a wave crash; spray struck the tent like spent bullets. As I struggled with my wet *kamiks* the floe rocked under me.

By this time the others were out of the tent. I was fumbling for the doorstrings when the whole thing came down on my head smothering me into our skins and kettles. I found myself kneeling in a foot of water which swept biscuits, mittens and tins before it. I scrambled out soaked and swearing. The sky was a dull gray hue and angry gusts came out of the south banking up sea after sea until they swept clean over our camp level.

The night before we had hauled the boat out on the ice to anchor our tent. It had broken through. Uvdloriark was nearly naked. Acpuddyshao strove frantically to hold the painter while the others threw in our sopping belongings. Though all feared the open water our safety lay that way. Every sea threatened to take the bottom out of our frail craft as it slammed heavily against the sharp, jagged ice. Before we shoved off the heaving floe had succeeded in making all of us seasick—mostly the result of our party the night before, no doubt.

Before a quartering gale we sped westward. Under our double-reefed sail we made amazing bursts of speed. Snow and rain mingled with other discomforts. In cold, wintry weather the Eskimo is at his best. In summer, hot, wet and bedraggled, he is more like a sick, ill-smelling cur kicked off an East River dock.

South of Cape Isabella the loose pack swung suddenly into sight. We raced it to Cape Sabine and won. Not 20 minutes after we entered Payer Harbor the ugly nubbles were crowding in, swarming up the ice-foot and snapping at our heels.

Cape Sabine is without reservation a villainous place for weather. This made the fourth time I had been snared in the clutches of its tornado-like blizzards. Here it was July and we were sitting around in our wet tent and shivering as if it were January. Uvdloriark improved the time by making a new harpoon from the tusks of our last walrus and a remnant of Peary's hut.

At the same time Nucarpingwah tried to fashion a lance tip from a steel bar and an old spade. His idea was to split the rod and insert a blade cut from the shovel. So accustomed was I to the endless tinkering and garbled chatter of the Eskimos that the two worked industriously on the job for at least six hours before I noticed what they were really up to. By this time they had wrecked my ice-axe and snow knife and had broken my only file into three pieces.

The trouble was that they didn't understand temper of steel, which made the bar and spade harder than their other tools. I showed them how to extract the temper by using my Primus stove as a blow torch, heating the metal and cooling it slowly. The job was finally done, but as usual the white man got no credit. "*Igminney,*" was their laconic comment, "it does itself"—an explanation that implied no cleverness was involved, only a trifling luck which had led to the original discovery combined with my small aptitude for imitation. This same term the natives applied to every device we boasted, from fountain pens to steam engines. It was the *explicit, sufficit,* of their limited vocabulary.

I later gave them another little tip for which they went so far as to express gratitude—although the Eskimo has no concrete word for "thanks." When a walrus or a narwhal is killed it is hauled out by stout skin lines rove through pulleys made from loops of the same material fastened in the ice. The skin is so greasy that friction is negligible. A narwhal is too heavy to haul entirely out but must be dissected gradually as its head and shoulders rise up over the ice edge. On one occasion, to speed things up, I detached the standing part from the animal's head and led it through the slippery chin slit to an ice nubble, thereby doubling the resulting pull. To their surprise the Eskimos walked the whole carcass without effort. "The tall white man," remarked Acpuddyshao, "pulls also with his head." They made me draw a picture of this tackle on Etukeshuk's whitest *kamik*.

We had a narrow escape from drowning the whole party just before we started back. Two walrus had been killed and butchered on a big floe several miles from land. After a rest and a mug-up we loaded the meat into the boat and started for a rocky point on which we had located most of our caches. Half a mile from the ice Etukeshuk and Nucarpingwah came alongside in their kayaks and got aboard.

They added to the mess in the boat. Besides great hunks of gory, greasy meat and skins, our tent, sails, spars and bags filled every available inch and cranny. We had dangerously little freeboard. But the weather was calm and we dared not make two trips lest the ice break up. I well knew the peril of not keeping the cockpit clear for bailing. However, my caution was disregarded when Uvdloriark began to shift the meat aft.

Suddenly Ahlneah clutched me. "The boat sinks!" she screamed. Water was pouring over the centerboard well. The boat was so deeply laden that the well's top now came below the waterline. Acpuddyshao, who always lost his head at such moments, rushed forward. "The oars," he yelled. "Back to the ice—we sink!" A fat chance, I said to myself.

Panic seized the natives. I thought they would capsize the boat in their struggle for the oars which were completely buried. Etukeshuk told me afterwards that he thought our rough handling in the ice had opened a hole in the bottom. One of the clothes bags covered the well. I snatched it away. At once all understood the trouble. To lighten the boat was our only hope. We started on the meat. Over it went, great heads and shoulders, lustrous ivory tusks, precious meat and fat and skin. But never a thought had we for the loss while 300 fathoms of icy water licked its chops below us.

The walrus meat must have satisfied the gluttony of death. In a few minutes water ceased to come in. We sat panting on the rail. An inquisitive seal bobbed up behind me. Ahlneah, who had been holding the rifle, cocked it and took aim. Apparently she was too excited to hold steady. She did not fire. The seal swam by. The first thing I knew the cocked and loaded rifle was pointed squarely at my chest. Ahlneah had closed her eyes and was screwing up her face in an effort to control her breathing. I threw myself sideways just as Uvdloriark knocked the barrel up with his harpoon. The shot sang over my head. This was the last straw for Ahlneah. Her nervous system, never very stable, lost its balance completely and she went off into one of her fits of sobbing and singing until Etukeshuk was forced to tie her arms and legs and sit on her. "It is well that she is *pibloktoq* just now," he said grimly, "for then we do not lament so much the loss of our meat."

When we reached land I examined my legs which had been giving some pain. I found both shins festering. Then I remembered scratching my legs at the time I climbed out on the ice after my swim. Apparently some of the bloody muck of our bilge water had been rubbed in causing infection. Rather than risk blood poisoning, I decided to return home. Already we had cached about a dozen walrus and narwhal and the fair weather might end at any time. We tried to make Anoritoq to get some skins and oil we had left there but a northerly wind drove the heavy pack down and we made Littleton Island only by the skin of our teeth. My legs were a mess for several weeks but the ulceration finally succumbed to cleanliness. This "Arctic Ocean fester" as the whalers call it is a dangerous thing.

I found the house at Etah deserted. Ek and Tanq were away on a biological expedition to Brother John's glacier. MacMillan and Jot were south of Cape Alexander preparing for an autumn crusade of exploration and ethnological research to be combined with enough hunting to carry us through December. Dr. Hunt and Allen were occupied in straightening out the awful disorder of equipment and provisions in which the preceding September had caught us when snow buried our headquarters.

On August 5 the ice broke out of Foulke Fiord. Without delay I began the survey which must be finished before September storms. Allen joined me in laying out triangulation stations. We built hundreds of rock cairns along the coast, travelling by kayak from point to point. As lumber was scarce there was no other means of marking. We got pretty sick of rolling heavy boulders around but enjoyed hunting as we went and often added a seal or a brace of geese to the next winter's supply.

Summer storms in the Arctic are the wettest in the world. A week of rain and snow drove us indoors about this time but ensuing fair weather lasted long enough for us to complete a very respectable chart of the fiord and its adjacent inlets. I had measured the base line by tape before the ice broke out. This gave such an accurate foundation to the work that checks I made later in the fall showed practically no error.

Topographic—in contradistinction to hydrographic—mapping was another matter. Between cliffs and glaciers and thousand-foot snowslides contours became more an offspring of the imagination than of absolute measurement. Decent use of the plane

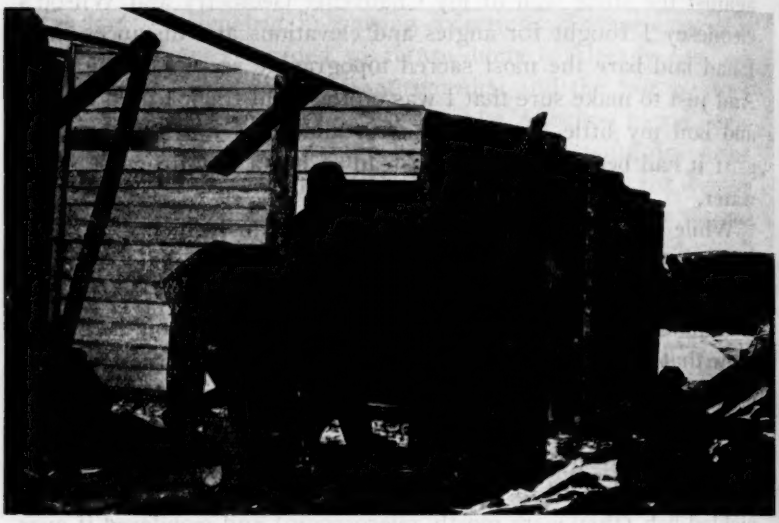
table was impossible. I should have "let it go at that" had not the smug immeasurability of the gorge-seamed plateaus goaded me into proving that man is not so easily daunted. Backed up against the stone wall of my Chauvenet Geometry and Wilson's Geodesey I fought for angles and elevations and distances until I had laid bare the most sacred topographic secrets of the land. And just to make sure that I was on the right track I used to stop and boil my little hypsometer with almost as much enthusiasm as if it had been a rich stew instead of but a few drops of snow water.

While Allen and I were dragging our instruments all over Greenland Jot had put the motor boat into commission. We had tried to blast it out of the ice early in August but succeeded only in ruining the deck and ripping most of the calking from its seams. Now that the harbor was clear Jot and Tanq went sweeping back and forth with their beam trawl out and a great deck load of patent nets and other gear designed for capturing the unsuspecting wriggler. The rest of us whose sympathies were zoological only from a carnal point of view shook our heads over Tanq's jars of pickled fish (they were mostly microscopic) and wondered if ever famine would reduce us to such fare.

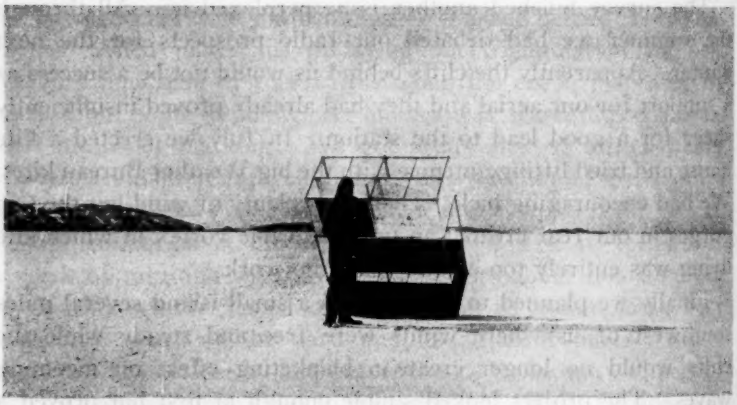
The survey finished another issue perplexed us. All through the summer we had debated our radio prospects for the next winter. Apparently the cliffs behind us would not be a success as a support for our aerial and they had already proved insufficiently sheer for a good lead to the station. In July we erected a kite house and tried lifting antennæ with the big Weather Bureau kites. We had encouraging luck. There was plenty of wind but the two gorges in our rear created an unmanageable vortex in which kite flying was entirely too erratic for radio work.

Finally we planned to move out to a small island several miles southwest of us where winds were free and steady while the cliffs would no longer create a blanketing effect on incoming waves. The project looked simple enough at first but proved a ponderous undertaking before we were finally installed. For lumber we had only a pile of broken provision cases and a few odd boards. Transportation must be by whaleboat with ice and rock to contend with. The engine alone weighed nearly a ton. Storage batteries and other gear came in smaller units but aggre-

gated at least 15 tons of dead weight to be got out over the floes and up through precipitous and snow-covered rocks. As usual with such jobs, all hands including the natives turned to. In a



GREEN AND ALLEN BUILDING RADIO CABIN ON WIRE ISLAND



ALLEN PREPARING TO FLY RADIO KITE, WIRE ISLAND IN BACK GROUND

week we had everything from switchboards to baking powder piled up on the granite ledge we had selected for our hut.

Wire Island, as we named it, is about a quarter of a mile in diameter and lies midway between Pandora Harbor and Foulke Fiord. Its rocky table top is not more than 200 feet above the

sea level. Our belongings were stacked on an ice-worn peninsula 40 yards long by half as wide. No wood, no grass, no nothing except rock—cold, solid rock. "Well, the foundation is all right," was Allen's verdict as we boiled a pot of tea before starting in to build.

Every task we undertook in the Arctic was a race with the weather. This one was no exception. We won; in 36 hours we had a roof over our heads and our perishable goods indoors. The shanty was 10 by 15 feet on the floor. Over our superimposed bunks it was 7 feet high, sloping to 5 feet on the opposite side. Some idea of the interior can be gained from the fact that besides our two bunks, pantry and book shelves, cook stove and table, we had a gas engine, electric generating set, dynamotor, a full radio sending and receiving apparatus (Telefunken) and a battery of 80 Ironclad storage cells, with full equipment of switchboards and wiring. Seems impossible, doesn't it? Just to stow all this stuff would nearly have filled our little home. But to operate and repair it, to sleep and cook and live in the same space with it, and worst of all to dry and sew the bulky paraphernalia of an arctic wardrobe in its presence, almost exceeded human imagination. The other members of the expedition frankly questioned our sanity when we even planned such an existence.

But it worked—the life, I mean, as well as the radio. Of course Allen had to lie in his bunk when I got supper; and I usually walked up and down outside until it came my turn to crank or my trick at charging the batteries. And when a bearing burnt out we pretty nearly had to cut the roof away to rig repair tackle. Even when the blizzard threatened to pluck the hut from its cleft in the rocks and hurl it into space we sat and chuckled at the futility of the blast. We were anchored by about 10 tons of steel and double that weight of boulders we had piled around the sides.

Only one dispute marred the usual good humor of these happily busy days. I wanted a window. Allen didn't. My whole soul rebelled at the idea of living by candle light while the sunshine still lingered. Only a few weeks more and the sun would be gone for good. But until then I wished to be able to watch the ice drift by, the seals play, and to enjoy the dazzling ruddiness of the autumn sunsets which stained the southern skies new hues each evening. With more sense than poetry Allen held that any sort of port would destroy the integrity of our wall, which was flimsy

enough already. And once we cut it, he argued, we should never be able to patch it properly again. He always concluded by assuring me that we ought certainly to have some means of escape for the poisonous and explosive vapors given off by the storage batteries. My objection to this was that there were cracks enough now to ventilate a Ford factory without cutting any more. We finally compromised by putting in a window 6 inches square got from the motor boat cabin, and cutting an air vent in the ceiling 1 inch in diameter. The gross result of eight days' violent controversy! Such is life in the Arctic.

One month later we had to plug up both apertures to keep from freezing to death.

We lived in the hut until January. The kites flew very well and took our aerial to a considerable altitude. But constant high winds with snow and the limited space we had for work made our experiments painfully tedious. Kite sticks were already cut but sewing and wiring must be done out of doors in temperatures below zero while biting winds frosted face and finger-tips.

By October 24, when the sun left, we had several kites built and the engine running smoothly. Charging the batteries was an uncomfortable task but had to be done weekly in order to keep them fit. Of course we had electric lights which added a great deal of comfort to our little box. During good weather we put our spare time into hunting. Somehow or other we seemed to eat the meat faster than we could collect it. While there was still daylight we finished the protecting wall of rocks around the house and patched on a tin roof made from flattened biscuit tins.

Just after this a memorable northeast storm started which blew incessantly for 24 days. During that period outdoor work or exercise was well-nigh impossible. Even collecting fresh-water ice for cooking took several hours each day.

We were very strict about our routine. The fire must be kept up in order to preserve the proper temperature for working the batteries. Allen rose about 4.30 a. m. and "cleaned fires" in our little stove. Repairs and overhauling occupied him until eight when he started breakfast. Beans and tea with hard biscuit formed our regular morning meal. Promptly at 8.30 I roused out of my bunk and sailed silently and with blinky gloom into my steaming ration. We were not a talkative pair. Sometimes whole days would pass with scarcely a word. But those who understand

life in the wilderness will know that this was a sign of a truer bond of companionship than 20 " talkfests " could prove.

We each laid out a course of study for these months. Allen was plowing with great zeal through higher mathematics and mechanics, and enlarging the scope of his electrical education. I devoted my time to chemistry and other professional subjects with enough of the natural sciences to open up the treasure houses of geology, paleontology, botany and ornithology, the portals of which the coming spring would unseal. Thanks to our library of several thousand volumes, I was able to gorge myself with psychology and philosophy, and other bypaths of science with which we became infatuated from time to time. Excepting Jot we all were voracious readers. We used to keep notes on our bookshelf explorations that enabled us to dispute with vast *éclat* upon any and all occasions no matter what the subject.

The results of all this concentrated study were often curious. One man who took up Freud's interpretation of dreams canvassed his companions and even the natives for somnambulistic experiences which he parodied with an embarrassing disregard for personal feelings. I got started on Emerson's " Efficiency " and Taylor's " Scientific Management." So imbued with their powerful spirit did I become that I tackled shorthand and mastered it in a few weeks, copying after the phonograph's dictation anything from popular songs to comic monologues. I practiced rapid reading until I could cover a three-decker novel in about two hours. All of which illustrates what utter confinement and isolation will do to a man.

Besides study and reading Allen and I drilled regularly with our wireless buzzer. At least two hours of outdoor exercise was the rule, though this meant stumbling up and down a 25-foot lane between two icebergs, in darkness, and being thrown ruthlessly about by a driving blizzard. At 5 p. m. Allen retired to his bunk while I prepared our other meal (we had only two a day). A hunk of boiled seal or walrus flanked by some dehydro vegetable and a quart mug of chocolate was about the average menu. On red letter days I made flapjacks which I turned by the scientific method of tossing. Frequently the cake missed the skillet. We used to find them later in all conceivable places about the house. One landed in the battery chest and jammed down in between the terminals, where it became impregnated with the electrolyte, finally short-circuiting the whole plant.

Supper done Allen returned to his bunk while I washed the dishes and swept crumbs into the corner where there was a convenient knot hole. By pulling the wooden plug from this hole I got rid of my sweepings without the necessity of opening our door and losing the precious heat. Chores finished, taking perhaps 10 minutes in all, I put out the lights and opened the stove door, which gave a very good imitation of an open fire-place. Invariably I stretched out on the battery box and played the six tunes I knew on my harmonica. Followed according to custom a talk about the navy, what the fleet must be doing, how much progress had been made in gunnery, and in general what we were coming to as navy men.

About nine Allen went to sleep while I enjoyed an evening of reading and writing. To top off the day when 11 o'clock came I would get out the little roulette wheel I had made and play for an hour. I used white beans for dollars and kept books religiously. By means of a private system devised under the quivering Aurora and within earshot of Allen's vibrating snores I eventually reached the million dollar profit mark, at which I sensibly ended my gambling. Later I sold the wheel and several thousand "dollars" to Sipsu for 10 fathoms of whiplash and a pair of mittens.

Exactly at midnight I filled the coal bin and brought in the morning ice. As the floor of our house was never above freezing we needed no ice-box. Having built up a good fire I stripped and turned in. Thus did we each manage to live a 15-hour day in total darkness and insufferable cold—outside—and yet with enough work, study and recreation to keep the terribleness of our environment out of bodies, minds and souls.

Paradoxical as it may seem we were on the whole busier this second winter even than the first. Three sledging expeditions had been projected in the late summer, when we laid up enough dog meat and skins of various kinds to equip the parties. Tanq and Hunt were scheduled for northern Grant Land. Ek was to cross Ellsemere Land and return by way of Greely Fiord. MacMillan and I hoped to penetrate the unknown regions west of Findlay Land, going through Beistadt Fiord, and thence west around the southern extremity of Axel Heiberg Land. Much exploration remained to be done in all these areas. We foresaw a great spring.

But we didn't count on the almighty devil.

The first year had seen the last of a good many items of our equipment. Trace material for instance, and sheepskins, and thread. Food didn't quite come up to what we had expected. More and more were we being reduced to native ways of sewing, eating, travelling and generally existing.

In spite of this two of the expeditions fell through from purely accidental causes. Directly after Christmas Tanq and MacMillan started for South Greenland accompanied by several Eskimos. The idea was to cross Melville Bay and reach Upernivik where certain much needed supplies such as sugar and line might be procured and got back to Etah in time for an early start on serious work. Unfortunately the party lost its way and wandered about Melville Bay for a week practically without food. The January moon set and left them in utter darkness. Wind and snow and thin ice encountered would have made travelling fearfully hazardous in broad daylight. But while stumbling about in pitchy black night, blinded by snow, without fuel, food or dry clothing, such conditions might well have proved fatal.

Providence guided the wretched half-dead men to Cape Seddon where lived two families of natives. Half an hour before landing MacMillan plunged into an open lead up to his waist. Though the thermometer was in the minus fifties he survived with only superficial frostbites. Tanq was not so lucky. With his usual grit he had borne uncomplainingly two terribly frozen feet for several days. His two big toes sloughed off on the way back to headquarters, effectually disabling him for the year's sledging.

In the meanwhile I had left Allen at the island to charge the batteries and shut up shop. We had sacrificed the fall to our radio experiments. Although we had not succeeded in communicating with Hudson Bay we felt the time well spent.

When MacMillan went south he left orders for me to lay out provision caches northward and across Smith Sound just as we had done the year before. I also planned to transfer all my boat trip meat from Cape Sabine to a point nearer Rice Strait in order to have it handy for our final route.

With dogs in splendid shape I left the house January 7. My Eskimos felt certain of bear. Despite the unusual cold I found sledging even more inspiring than the year before when I had been a green hand at it. We reached Cairn Point the first march

with more than a ton of oil and pemmican. Our igloos nestled in the same old wind-spit of a gully. Next morning it was Arklio's turn to make tea. I dozed for a few minutes after the stove started to hum. At "keezah timah" (it's finished) I rolled over on my stomach and tried to raise myself up on my elbows. I found I couldn't move. Unbearable shooting pains paralyzed my shoulders and ran down into the small of my back. By experiment I discovered my legs were in the same condition.

At first I imagined that the unaccustomed labor of the previous day's 40-mile hike had knocked me out. But I was in good hard condition and shouldn't have minded a little jaunt like that. Whatever it was I realized I couldn't go on but must wait and go back as soon as possible.

Twenty-four hours later I was able to sit on the sledge and ride. On my return Dr. Hunt hesitated to diagnose my case which the others thought might be scurvy. He felt inclined to call it an acute attack of rheumatic fever, which it later proved to be. But so far as travelling went I might as well have been dead.

With two of us down and out MacMillan turned with indomitable optimism to helping Ek prepare for the most complete fulfillment of his plans. Another unforeseen contingency nearly shattered them at the last moment. Instead of the usual February break-out south of Cape Alexander extraordinary cold carried the heavy shore ice clear to the Cary Islands, 15 miles out—an unheard-of event. Consequently no winter walrus were to be had; and our precious reserve meat went to keeping the teams alive. Famine descended upon the tribe. Had it not been for supplies we distributed among them there would have been many deaths. As it was most of our friends among the natives ate their dogs and many of their skin garments. Our own people at Etah wanted blubber for their lamps even worse than meat for their bodies.

In the end we were forced to take five families into our own house and supply them with kerosene, of which we still had a good deal. The women boiled meat and eider duck eggs (which were always rotten) in large pots on our stove. Our two meals, at 9 a. m. and 5 p. m., were followed by gluttonous riots about the table when 30-odd Eskimos scrambled for their ration.

This enforced intimacy was far from pleasant but we found that if the natives had to eat in our house it was best to have the scene of their gorging as open as possible in order to expedite sub-

sequent cleaning. Two women were on duty for a week to rake up after the barbecue. Although this pigsty life was in many ways offensive I must say that a crowd of Eskimos is the jolliest community in the world. Between the puppies and the children there was not a dull moment in the day.

Tanq, Jot and I, as convalescents, remained at home keeping up the meteorological records and preparing so far as possible for the next summer's scientific work. All this involved an immense amount of detail which kept us very busy. MacMillan and the others were away travelling most of the time, either collecting meat and data or laying caches for the expeditions still possible.

Ahlningwah failed to appear one morning. As it was her turn to wash down I went into the shed where she slept and tried to haul her out. She was babbling and singing away at a great rate. It was delirium. We rolled her nakedness up in a deerskin and laid her near the stove. The Eskimos thought she was merely a victim of a new kind of *pibloktoq*. But they were frightened.

The native has great faith at such times in the white man's power. However, the combined powers of Jot and Tanq and myself were nothing to inspire confidence even in an Eskimo. I had once been in a hospital with appendicitis. I gave Ahlningwah a "physical" based on this experience. Having tabulated my results we consulted Osler's 1000-page treatise on diseases for something which corresponded with our observations. The least horrible and most likely distemper was pneumonia. Excepting some technicalities not defined in Webster we gave our patient the standard treatment for that ill.

Several times we thought her dead. Finally the crisis came—at least from what the book said we thought so—and she began to recover. Dr. Hunt returned about this time and pronounced that she was suffering from something-itis. But she didn't die. And she declared that *we* had saved her life. Which was sufficient reward.

By March 10 the sun was high enough for good daylight travelling. Enough meat had been scraped together to put seven teams in the field. Our plans boiled down to Ek's crossing Ellsemere Land, returning through Greely Fiord by way of Lake Hazen and Fort Conger. I would go up the Greenland side by Humboldt Glacier to Cape Constitution and help him home. MacMillan and Hunt had a number of shorter journeys laid out in order to com-

plete a good deal of the coastal work we had not had time to finish the preceding year.

Greely Fiord was discovered by Lockwood and Brainard in 1883. It is approximately 60 miles long and 10 to 15 miles wide. MacMillan and I passed its entrance on our way north in 1914. Up to this time no man had traversed its length. The adjoining regions are completely unexplored. Ek hoped not only to be the first man through this great frozen waterway, but to penetrate the areas lying both north and south of it.

He left March 26 with his own and four supporting sledges. Arklio and Uvdloriark returned a week later with news that bear and musk-ox had been killed and that Ek was progressing in great shape. His travel proved uneventful until Greely Fiord was reached. Here such heavy snow was encountered that the dogs floundered helplessly in the soft, deep drifts. This handicap reduced the daily average to less than 10 miles. Despite many difficulties two deep tributary fiords were discovered, explored and charted.

May came with warmer weather and even worse going but Ek forged bravely ahead until he reached the snowy ranges of Grinnell Land. Though Greely's rough sketch maps were exceedingly difficult to follow the little party managed to break a way through this almost impassable barrier, finally reaching Lake Hazen. Here musk-oxen were found and the lean dogs once more took on a semblance of health and customary vigor. Ek made the mistake of trying to eat as much as my old friend, Etukeshuk. As a result he had a violent attack which nearly finished him. From his account I judge that he gobbled a stomachful of big lumps, Eskimo fashion, so that his peloric valve became congested and shut up shop for a time.

At Etah the spring passed rapidly with much profit to the expedition. MacMillan carried his ethnological work into the rich field north of us. Tanq, though crippled, was busily occupied in our little laboratory. I got into the field as soon as my strength returned and spent some time on topographic work on and about Brother John's Glacier. I built my own snow igloo, lined it with canvas, and set up housekeeping. I found it more comfortable than a tent would have been in such cold weather. One of the men brought Tanq up to stay with me. A storm broke the next morning and for 48 hours we lay imprisoned. Tanq's lack of confidence in

my igloo caused him a great deal of unnecessary worry. However, he would have had a hard time had we been forced to abandon our shelter. His feet were still in no shape for travelling.

On my return I quickly collected my dogs and sledges for the trip north to Ek's relief. I was due to meet him not later than June 1 in the vicinity of Fort Conger, if possible. I left Etah on May 23, 1915, with two Eskimos and three teams. In order to carry out that part of my orders which called for a survey of the coast I had planned to check the available maps of this region. According to the legends upon those prepared by Hall, Kane and Peary, no general triangulation had ever been attempted. Their work purports to be no more than the result of a series of widely separated astronomical observations connected by sketched and roughly measured contours of the shore line. Having assumed the observed latitudes to be correct, I endeavored only to reconcile with them the plotted longitudes. I measured the distances between headlands with fair accuracy by combining our rate of travel with the elapsed time, allowing for delays. Each day's result gave me a good comparison for my running angle computation. As an additional check I had hoped to observe a complete set of azimuths at each camp. But limited time and an unlimited variety of weather confined me to a few watch-sun bearings. With the exception of that portion of the coast between Cape Calhoun and Cape Constitution I found no considerable discrepancy in the published positions of prominent landmarks. When I had the advantage of fair weather I was able to revise the delineation of several minor traverses. My drawings are therefore substantially correct.

Nothing less than a rigorous triangulation could yield a strict projection. For convenience of travel my revision of the local charts is adequate; for scientific reference would be required a mathematical precision for which no expedition has yet been prepared except at its headquarters. In this connection I venture to say that those features of the coast depending upon longitude are necessarily only approximate. In high latitudes azimuth and time are obtained by a great deal of repetition, which alone can eliminate errors, a process that is as yet impracticable in arctic field work on account of the terrible conditions under which a man must work. The longitudes of the main stations alone can

be relied upon—I refer to North Star Bay, Etah, Kane's winter quarters, and the other situations of former expeditions.

Our journey differed little from the others. Excepting tea and biscuit, I and my men lived off the country. We had seals for the dogs as well as ourselves almost every day. To vary the diet there were hare, gulls and bears. Across the monotonous stretches of Peabody Bay and through the wild ice of Kennedy Channel we hunted and killed seven bears before reaching Cape Independence. There we camped to rest the tired teams and to ascertain the state of the trail north.

We had just finished skinning an old mother bear and her three cubs and put on the pot for a feast when the alarm came. The dogs set up a great uproar. My Eskimos dived out through the door hole. I thought of course that it was another bear and seized my gun. To my great joy and surprise I spied three teams just rounding the cape. It was Ek's party. Which was which I could not tell until one of the three grimy, skin-appareled savages pushed back his hood and I saw Ek's bald head pop out. We journeyed back in the luxury of perfect weather. After the loneliness of travel in native company we two white men found each other's society very welcome.

We reached Etah on June 16, 1915. I soon realized that I had over-estimated my strength, and had not fully regained my former vigor. In the few weeks remaining I was able to assist Allen in breaking down and packing, engine, wireless, batteries, instruments and accessories. The scientific program was concluded by the others. Since our whaleboat had been carried away by a gale and the motor boat engine had deteriorated beyond repairs, there remained for water service only our dory and the native kayaks or skin boats. Unusual ice conditions combined with the continual cold, wet weather greatly hindered all outdoor work.

Owing to the failure of the seismograph clock no records were taken though the instrument was set up under the house. I made no attempt to erect a shelter for extended magnetic observations. The leader considered wireless our first duty and paucity of building material forbade a suitable shelter even for that. The meteorological log and recording instruments were tended to the end by all members of the party.

June and July seemed years long. We had expected a ship in 1914. This year we were certain of it, barring accident. Our

coal and food supply was low but we had learned to live like Eskimos and feared neither hardship nor starvation. What we dreaded was the awful monotony of another winter when lack of ammunition and equipment would prevent our customary activity and make the time nearly a dead loss.

And we longed for mail, for news of the outside world, and of our friends and families. That some kind of war had started the year before we felt tolerably certain. But as no real account of it had reached us as yet our conjectures were vague and grotesque.

By August 15 we dared delay no longer but seriously set about preparing for another winter. Food for ourselves and the dogs was our first consideration. MacMillan organized a hunting party to Sulkwaddi lying on the northern shore of the bay into which Sontag Glacier feeds. The name means "place of the sea-pigeons" and the remains of several igloos on the spot testify to its habitability. Walrus are more numerous here than perhaps anywhere along the coast, the result of three active glaciers which plow up the bottom of the sea, thereby creating rich feeding grounds for seals, narwhal and walrus.

Our expedition consisted of all except Ek and Tanq. Four of us went in the dory. MacMillan and several of the Eskimos followed in kayaks. After killing a dozen seals and *ugsut* on the way, we arrived. Herds of bellowing walrus greeted us. White arctic hares scampered away from the spot we selected for our tent. And the high hill behind faced south, where any moment might loom up the ship and come smoking out of the frost-haze.

We were not happy long. Snow and wind were interspersed by soaking rain. The tent leaked. The stove failed. Food ran short and we were altogether miserable. But worst of all, no matter how often we struggled up the drenched hillside no distant hull appeared. To my last day shall I remember how black icebergs drifted out from Inglefield Gulf 20 miles south of us. "By God!" the Doctor would exclaim and spring for his binoculars, "There she is, sure as hell!" And out he would dart while we, just as anxious though less perturbed, grabbed stove and teapot and sometimes the whole tent lest it collapse.

Then how we would strain our eyes! Bloodshot, tearful eyes they were, what with the foul weather and fouler smoke-drenched atmosphere inside our ragged shelter. Perhaps for hours we could discern masts and rigging, funnels, hull—and Hal once saw the

wake 20 miles away! But when the tide turned and our vessel (iceberg, always, of course) retreated, no words could suffice to express our disappointment. Back we went to our pot of boiled walrus; back to the damp, dank sleeping bags, each to his own sad surmise.

The weather turned fair. We killed seven big walrus, cached them, and went sadly back to headquarters.

On September 15, 1915, Dr. E. O. Hovey reached Etah by motor boat. He was in command of the relief expedition sent up on Dr. Grenfell's auxiliary three-masted schooner *Cluett*. She lay fast in the ice at Saunder's Island 150 miles south of us.

We packed what we could aboard the launch and made the *Cluett* in three days. She put up a brave fight with the ice but never got past Cape York. I left the expedition on the 26th of September with two Eskimos and spent the fall sledging supplies and meat from the north. In January Tanq and Allen joined me in an effort to escape through South Greenland in order to get word to America that help was badly needed, particularly as our number had been augmented by the crew of the disabled vessel.

Next summer—1916—we were able to secure the steamer *Danmark* from the South Greenland Trading Company and send her back to our party. Also the schooner *Kap York* was impressed into our service.

We three who had gone south finally reached New York in the fall of 1916. But not until late in 1917—four years after departure from America—did the good news come that our friends were safe. The *Danmark* had been caught in the ice within 50 miles of the scene of the *Cluett's* misfortune. The *Kap York* never penetrated the Melville pack. And not before the indomitable Bob Bartlett took the *Neptune* through was relief finally consummated. The remaining members with specimens and records reached Sydney, N. S., late in September, 1917.

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THE NAVY YARD SPIRIT

By Naval Constructor C. W. Fisher, U. S. Navy

1. The importance of efficiency in navy yard industrial work is evident. The speed, excellence and economy with which work on vessels of the fleet is accomplished has a direct bearing on the readiness of the navy for war. Proper facilities for performing the work are of course required, and these are being provided and improved continuously. An adequate supply of labor is also required, and barring certain abnormal conditions existing at this time (February, 1917), this is also available. The mere combination of labor and facilities, however, does not insure efficiency. A worthy and continuing *policy* must be announced towards the fulfilling of which all endeavors are bent; an *organization* is required to co-ordinate the different activities; a *system* must be provided through which the organization can operate. But even these essentials are powerless to produce lasting success unless there be, permeating the whole force, a proper spirit. This spirit corresponds to that intangible quality of military bodies called *morale*. Successful generals and admirals have recognized the necessity of an excellent morale among their men, and have devoted much time and effort to create it. The equally great necessity for an excellent *morale*, or the "proper spirit," in industrial establishments, is witnessed by the varied means adopted to secure it, such as picnics, banquets, employés' newspapers or periodicals, athletic clubs, gymnasiums, club rooms, contests, etc. A navy yard is an industrial plant and a military command combined, and an excellent morale is therefore doubly necessary for it. The spirit of the employés is what really produces success in the long run, and that spirit which animates navy yard employés will show itself distinctly in the condition of the vessels based on the yard. The cultivation of the kind of spirit that is needed, by careful and deliberate training in zeal, loyalty and courage, education in

patriotism, and the development of minor supervisors to perpetuate the "Navy Yard Spirit," is an aspect of navy yard administration that has been given little if any consideration in the past. Individuals have recognized the importance of this work from time to time, but official recognition has been totally lacking.

2. This is nothing but the human problem again as it affects the industrial portion of navy yards—the old "man" equation as against the "machine" equation. In the last analysis the work is done by *men* anyway—not by *machines*. The machines merely assist the men. And when each man is alert, and efficient, taking conscious pride in his work, and knowing his individual efforts are appreciated, not only does the man's efficiency increase to a startling degree, but the machine question takes care of itself, because the men themselves demand the best facilities to assist their best efforts.

3. How can the right Navy Yard Spirit be obtained? Congress does not—yet—appropriate money for picnics, banquets and athletics, for navy yard employés, but a start can at least be made in the inculcation of this spirit among the leadingmen and quartermen of the yard, who, in close contact with the other employés are especially well placed for the dissemination of the principles which should eventually become a creed for each member of the navy yard organization. To them the individual mechanic or laborer looks for guidance, example, reward and punishment. If they, as a class, are lacking in any of the qualities that go to produce the best results for the yard and the navy, it is certain that the mechanics will be equally deficient, and the prestige of the yard will be correspondingly lowered. Before taking up the education of leadingmen along these lines, however, and before blaming them for not having been automatically taught, it is necessary to consider the type of men they are, how they happen to be leadingmen and the difficulties under which they labor. As leadingmen and quartermen are promoted from journeymen employés of the yard, I shall begin by discussing the methods of hiring men.

4. *The Choice of Material.*—In all endeavor, if the best result is to be attained, there must enter into it the best material and the best workmanship. In nothing is this so true as in products composed of human beings. Hence the importance of wisely selecting the material from which the working force of a yard is to

be built. It is true that there is a continuous process of selection and weeding out going on, but the better the raw material the less there is to be discarded. Furthermore, bitter experience has shown that the wasted cost of hiring men, only to find out later that they are not suitable, is no inconsiderable item of overhead expense. At times this cost has run as high as $200 per man, and the more progressive institutions are now employing high salaried men, expert in judging character, and skilled in the knowledge of the company's needs, as heads of the Labor Employment Offices. These men personally interview every applicant for work. Results have proved the wisdom of such methods.

The first efforts along these lines were made by a psychologist who devised an elaborate device for ascertaining an applicant's fitness for the position of locomotive engineer by recording the time required by him to re-act and execute the proper motions in controlling a locomotive when certain signals, simulating track signals, were shown to him suddenly. From an interesting experiment in applied psychology, the principle has been extended to practical use in employing men. In the last five years, following this lead, specialists have appeared, prepared to inform young men as to the trade or vocation for which they are temperamentally best fitted; several institutions of learning have established departments for advising their students along the same lines, and even the Federal Government is conducting a scientific investigation of the process.

5. *Obtaining the Raw Material.*—Navy yards, in times gone by used to hire men by the good old principle of "first come, first served," modified in part by many complicated rules for affording preference of employment to veterans of wars, ex-soldiers or sailors and old employés. (Navy Yard Order No. 23.) All that an applicant had to do, besides filling out several forms, was to state that he was a mechanic, and his statement was, in general, accepted. When in due course of time he was employed, actual trial at work would determine the truth of his statement. Practically nothing was attempted in the way of ascertaining the applicant's ability and character, and moreover, no provision was made whereby the best man on the list of eligibles could be employed. It was "first come, first served," and it was frequently necessary to "call" or employ several, before a competent man was obtained.

The above was controlled in part by the United States Civil Service Commission, but navy yard employés were not a part of the commission's classified service. On December 12, 1912, however, the navy yard employés (with some few exceptions) were placed by executive order of the President of the United States in the competitive classified service of the United States, and the rules of that service have since been followed. For present purposes the only change in procedure that requires comment is that an attempt is made to grade applicants in accordance with their ability and place them on the eligible list for employment in the order of that grading. The applicant describes (under oath) his experience in the trade, on a form provided, and gives the names of two or more reputable citizens who are asked by the Navy Yard Board of Labor Employment to describe the applicant's qualifications on a confidential form or voucher.

Generally, the vouchers are prepared in such a perfunctory manner as to be almost useless, and the man's own statement of experience serves as a guide in rating him, mainly by considering the rates of pay he has commanded.

Although the reading and grading of these applications and vouchers is a tiresome task, once in a while a ray of sunshine appears. An applicant for the job of riveter stated: *Term of last employment,* two years. *Name of employer,* God the Father, Son and Holy Ghost. *Nature of duties,* evangelist. (He was rejected for lack of competent vouchers.)

The principle underlying this method is undoubtedly good, since it purports to afford equal opportunities to all citizens of the United States, and the men are to be employed in the order of their skill and physical condition (a physical examination is included). Practically, however, there has been no marked improvement except that physical defectives are barred. Even this phase has its disadvantages because the penalties for certain physical defects may render an applicant ineligible under the rules, although it may be self-evident that the defects in no way affect his skill or efficiency. For example, the loss of a foot is usually sufficient to bar a man. Yet there is employed at one navy yard a mechanic who has an artificial foot, yet he is so active and competent that very few of his mates know it. At another yard a deaf mute is employed as a pipefitter, and careful records show him to be

one of the most efficient in the gang. These men were employed before the present rules went into effect. If they are discharged now, they could probably never be re-employed.

Some applications, of course, are made from a distance. In such cases, the suitability of the applicant must be determined from written evidence. But in most cases, personal interviews are possible, and in the hands of a trained man, supplemented by a discriminating medical examination, they are worth dozens of vouchers and forms. It is to be hoped that before long the present iron-clad rules will be replaced by a logical and scientific method that is elastic enough to permit the government to employ at any time those particular men whose services will prove of greatest benefit to the yard.

So much for the present methods of obtaining the raw material from which navy yard supervisors are chosen. It is to be noted that nowhere (except possibly in the vouchers, where it is extremely rare) is any stress laid upon such qualities as personal appearance, force of character, ambition, executive ability, zeal, patriotism, tact, wisdom, alertness of mind, etc.; qualities absolutely essential in a leader of men.

The manifestly unfit among the employés are gradually weeded out by discharge or reduction in pay—an expensive process, to be sure, but better than none—and the result is the navy yard force. This consists of three distinct parts. First, a permanent nucleus composed of the foremen and about 50 per cent of the men who are almost never discharged or furloughed, on account of exceptional ability, long service, special nature of their employment, or even less valid reasons; second, a semi-permanent group who usually live in the immediate vicinity of the yard and are reasonably good men, in number about 25 per cent; and third, a group of "floaters," constituting the men taken on in rush times, men seeking to better themselves, men who are not satisfied to remain permanently in one place. In ordinary times this group will form about 25 per cent of the normal force.

The leadingmen and quartermen are obtained by promotion, from these men, according to certain hard and fast rules.

6. *Promotions.*—Promotions to the rate of leadingman and quarterman are made by selecting one of the three highest men on the eligible list of the trade, and having the selection approved by the Secretary of the Navy. The eligible lists are the result of

periodical examinations of those mechanics who apply to take them. Up to two years ago these examinations, part written and part oral, and allowing credit for past experience, were conducted by the navy yard authorities, and the board always contained those officers whose duties brought them into intimate contact with the men. For the last two years, however, the examination has been conducted under the auspices of the Civil Service Commission by the Board of Labor, which is gradually being re-constituted in such a way as to eliminate those officials, naval or civilian, who are in the best position to judge of the applicant's qualifications. At one navy yard, the board which conducted the examination in January, 1917, was composed of the captain of the yard, hull planning superintendent, assistant shop superintendent and the district secretary of the Civil Service Commission. Of these, the only member whose duties brought him into direct contact with the men, was the assistant shop superintendent. When the labor boards are all reorganized to conform to the present regulations, they will consist of one officer and four civilians, three of whom may be, and probably will be, mechanics. The result will be analogous to having a board of lieutenants examining another lieutenant for promotion to lieutenant commander.

This examination is divided into two parts of equal weight. The first part, *General Experience,* consists merely in rating the application at its face value as modified by the confidential vouchers, exactly as is done in the case of a man seeking a job as a mechanic.

The second part, *Executive Ability and Fitness,* is determined through an oral examination, and is subdivided into the following heads:

(1) Such personal appearance, address and manner as will tend to inspire confidence in his ability and integrity and respect for himself and the service.

(2) Equable temperament—the quality of maintaining poise and self-control under trying circumstances; force and stability of character.

(3) A mind that is alert and can act quickly and at the same time wisely.

(4) Sound judgment, discretion (tact), resourcefulness, and common-sense.

Can such qualities be determined by a series of questions? The board of which the writer is a member had 73 applicants to examine, and sat almost continuously for seven days, yet it was felt that, of the four heads above, the "personal appearance" was the only one that could be even tentatively determined.

The name *leadingman,* is apt; it describes succinctly the qualifications that should go with the office. The individual holding the office creditably however, is in a position of more than ordinary difficulty, because, by existing regulations, if the force of mechanics fluctuates to such an extent that the leadingman has less than 12 mechanics to supervise, he must, through no fault of his, be reduced to the rating of mechanic and go to work as a journeyman with the men he has been directing. Such reductions are not infrequent. It is, therefore, easily comprehended that the temptation is strong not to be too strict a disciplinarian, for an unpopular mechanic in a shop can have his life made very miserable indeed. The principle is wholly wrong and unknown in military or outside industrial organizations. It presupposes an unusual strength of character and actually encourages lax administration by the leadingman. This condition is undoubtedly one of the causes of the unsatisfactory nature of the replies to questions involving the assumption of authority and responsibility.

Certain typical questions were asked each competitor under the last three heads above. Some of these with summaries of the answers, are given below.

Q. Have you ever read any order or paper stating the duties and responsibilities of leadingmen and quartermen?

Not one of the applicants stated he had; furthermore, not one admitted he had made any effort to obtain such a statement. (As a matter of fact there is no official statement of the duties and responsibilities of any of the navy yard supervisors.) Even their defective knowledge of the rights, responsibilities and privileges of a leadingman was obtained by hearsay.

Q. To make it worth while to appoint you a leadingman, you should be capable of showing a saving to the government at least equal to your advance in pay. Can you suggest any such saving concerning men, methods, or material?

About 25 per cent, after thinking, would suggest something in connection with material; about 10 per cent made suggestions in regard to methods (usually asking for a new machine tool); only

one touched upon the subject of handling men. Nearly all stated that such topics were outside their jurisdiction and that they had never given them a thought. They intimated that suggestions were apt to be viewed as criticisms of individuals, with consequent bad results for the suggestor.

Q. What is the greatest need of the yard to-day?

Only three or four answered this. The remainder confessed they had never considered the matter.

Q. Assuming you have in your gang an excellent mechanic, who dislikes you personally; he becomes mutinous and abusive to you. How would you handle such a case?

Less than 30 per cent suggested a transfer to another gang. The majority would report the facts to the foreman, but would not make any recommendation as to punishment or action to be taken.

Q. Assume that you are in direct charge of a gang of mechanics. Is it your business to recommend promotions and disratings?

Nearly 80 per cent replied that it was not, unless specifically asked by the foreman.

Q. When times are slack and you are directed to select six of your men for discharge, how would you pick these men?

Not more than seven or eight would keep any record of the relative efficiency of their men. The majority would depend upon memory and their general observation.

Q. Suppose a fire or explosion suddenly occurs. What would you do?

Not one would call on bystanders or men outside of their own gang for assistance.

The general impression given by the candidates was that the positions sought were rewards for good services as mechanics, and that the qualities of leadership were wholly incidental. There were, of course, some refreshing exceptions, principally among the younger men, who had not seen much navy yard service. But it must be borne in mind that the candidates represented the pick of the navy yard force—by common consent the men most eligible for promotion.

The above examples are cited in confirmation of the conclusion, formed during nine years of navy yard experience, that even the better men among the mechanics are:

(a) Conservative, and in a rut of local methods.

(b) Lacking in powers of observation.

(c) Lacking in ambition to force their way to the top.
(d) Woefully lacking in initiative and willingness to assume responsibility.
(e) Generally afraid of their superiors.

These undesirable characteristics could in most cases have been supplanted by the opposite good qualities through a little training and help. Such training will never be given, however, as long as officers detailed for navy yard duty come and go as they do now—unless the training be made mandatory by the department.

Although stress has been laid on the difficulties in the way of securing good supervisors, it must not be concluded that they are all hopelessly bad. They are not, and as a matter of fact they are better than we have any right to expect under the circumstances. Furthermore, they are slowly but steadily improving, this improvement being the result of the individual's own efforts. Think what the improvement might be, if given the assistance it should have.

7. *Conclusion.*—Vigorous efforts have been made during the past 10 years to increase the efficiency of our navy yards, not only by departmental orders, but by the local officials. Such efforts, to be successful, must have the co-operation of all. Now, if the characteristics above noted obtain among the supervisors to any extent, it is to be expected that progress and efficiency will be correspondingly hampered. It is patent that growth has taken place, but it is equally evident that the growth is by no means comparable with that which has taken place in commercial plants of this country. The reduction and eventual elimination of these undesirable qualities will go far towards promoting the welfare of our industrial navy yards.

When we remember that these men, supervisors and would-be supervisors, are without doubt above the average in mechanical knowledge, intelligence, and ambition, we are forced to the conclusion that they cannot be, as a class, inherently hide-bound, unobservant, slack, irresponsible and timid—and they are not. They are good, reliable, sturdy American mechanics, but they have never been *taught*. We train apprentices to be mechanics, after a fashion, and our fashion is continually improving; but we never think of training mechanics for the highly important duties of leadership. At best, the candidate for a leadingman's job is

treated like the boy who was taught to swim by being thrown overboard; if he makes good, very well; if he fails, he goes back to the gang, with considerable loss of standing, and not infrequently filled with resentment.

There is a total lack of deliberate and intelligent training for the supervisory positions in navy yards. Training for promotion is rather highly developed in the navy itself, and has been found decidedly a paying proposition. It would pay a thousand-fold in the navy's industrial establishments. The discontinuity of service of officers presents no more difficulty ashore than it does afloat (although the same high degree of efficiency cannot be expected from a shifting executive personnel as from a permanently progressive one), if there were something permanent upon which to build. This foundation should be a policy, definitely promulgated by the Navy Department, encouraging the training of mechanics and supervisors for promotion. The response from the employés would be prompt. The result of this training would be such a marked improvement in the morale of the navy yard force, and such an increase in their general efficiency, as would pay for the necessary expenditure many times over.

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WHAT HAPPENS IN AN AUDION

By LIEUTENANT J. B. WILL, U. S. Navy

In order to understand something of the physical characteristics and action of an audion or similar device, it is necessary to know something of the electron theory, as now commonly accepted. A brief review of this theory is therefore given.

The smallest unit particle of an elementary substance is called an atom. Atoms of two or more elementary substances may combine chemically to form a " molecule " of another substance, which may have entirely different characteristics from those of either of the elementry substances. No one ever saw an atom, but just as we distinguish different bells by their notes or vibrations in air, so the physicist distinguishes the different kinds of atoms by their notes or vibrations in the ether, which produce in us certain optical sense illusions, such as the bright lines in the spectrum of an attenuated gas. Anything vibrating must be conceived of as undergoing strain or changing its shape. But this forces us to further suppose the atom to have parts capable of changing their relative position. So we now come to the idea of the ultimate parts of an atom, which are called " electrons."

Electrons are so small that if an atom were enlarged to include the solar system, the electrons in it would correspond to the planets. The analogy holds good in more ways than one, for the separate electrons are supposed to have fixed orbits in the atom, and the number of the electrons and the relations of their orbits determine what kind of an atom it is. An electron may be a mere "whirl" or "strain form" in the ether. Whatever it is, it has what is known as mass, and it carries a charge of negative electricity. It may be, indeed, that the charge of negative electricity *is* the electron. It may be noted that the electrons that we commonly have to do with are negative electrons, and the word electron in general means a negative electron. Physicists now tell us that

there are also positive electrons, and that a positive electron forms the nucleus of an atom, but they are much more elusive than negative electrons, and we are not concerned with them in this discussion.

The weight of an electron has been calculated to be (6×10^{-20}) grams, and its charge to be (1.59×10^{-19}) coulombs. If an atom loses an electron, the system is unbalanced and the atom has a force of attraction for the missing electron. The atom is then said to have a positive charge. An atom or molecule, minus an electron, is called an "ion" or a "positive ion." If an atom or molecule has an extra electron it has a negative charge and is a "negative ion." This condition probably does not occur in the case of gas atoms.

A so-called electric current is a flow of electrons. The electrons go from a negative to a positive direction; that is, in the opposite direction to the ordinary conventional "direction of flow" of an electric current.

Sir William Crookes discovered that if electric current is passed through a highly exhausted glass tube, negatively charged particles are flung off the cathode at a very high velocity. These particles he found to travel in straight lines with extraordinary penetrative effect. When suddenly stopped, they give rise to certain peculiar vibrations which are called "X-rays." These particles which he called matter in a "fourth estate" are what we now call electrons.

It is now known that any solid, if heated enough, will give off electrons. The hotter the body is, the faster the molecules in it vibrate. Collisions between molecules must occur in great numbers. Every now and then an electron is clipped off the molecule to which it belongs by the force of such a collision. The mass of the electron being so very small, the velocity imparted will be very great (energy equals half the mass times the velocity squared)—great enough perhaps to enable the electron to penetrate the surface of the body; and if a sufficient vacuum exists around the body so that the electron does not immediately collide with a gas molecule, it flies off into the surrounding space. Some substances give off electrons more readily than others, for the simple reason that they get hot enough to give off electrons before they reach the temperature of volatilization, at which temperature the molecules themselves begin to leave. Other things being equal, the hotter the body is, the more electrons are emitted. The character of the

surface is one thing that affects the emission. The slightest coating of oxide on the surface of a metal may considerably reduce the number of electrons given off. They simply can't get through the surface as readily under this condition.

Suppose, therefore, that we have a tantalum filament in an exhausted globe, the filament being heated to incandescence by an electric current from battery *S* (Fig. 1). At the same time we have a plate *P* in the globe, which plate is connected through a "wing circuit" and battery *B*, to the negative terminal of the filament, as indicated. By this means the plate is made at a positive potential with respect to the hot filament. Therefore, electrons (being negative) leaving the filament will be attracted by the positive plate, will impinge upon it, and pass through the wing circuit

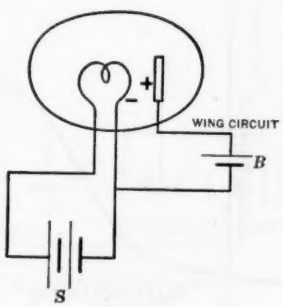


FIG. 1

and back to the filament. In other words, an electric current will flow in the wing circuit. Even if there is no battery in the wing circuit to give the plate a positive potential with respect to the filament, the electrons may bombard the plate with sufficient force to penetrate its surface, and so establish a current in the wing circuit. But in general the higher the potential from plate to filament, the more of the emitted electrons will enter the plate. If, on the other hand, the *B* battery be so connected that the plate is negative with respect to the filament, the electrons being themselves negative, will be repelled from the plate, and no current will flow in the wing circuit, except that for very low negative potential on the plate, the electron bombardment from a good hot filament may be strong enough so that some electrons will penetrate the surface of the plate and thus cause a current in the wing circuit, in spite of the slight negative potential on the plate. Practically, this condition never occurs.

There are, then, in a perfect vacuum, two things upon which the wing current depends. (1) The more the filament is heated, the more electrons are given off, and (2) the greater the potential from wing to filament, the more of these electrons pass through the wing circuit. A typical characteristic of wing current plotted against plate voltage is shown in Fig. 2. It may be seen from inspection of the curve that we have here a rectifying device for alternating currents, because a small variation of plate potential in one direction will give a much greater variation of wing current than the same variation will give, if in the other direction. Thus the device may be used as a detector for radio work. The action of very many wave indicators may be generalized by the simple condi-

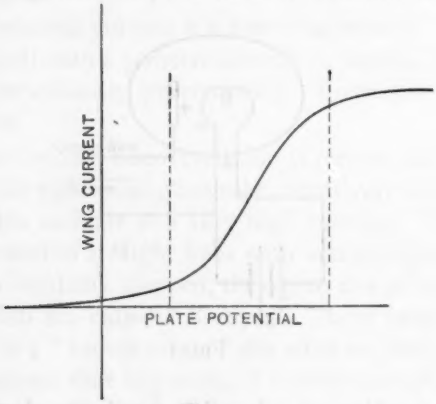


FIG. 2

tion that their characteristic curve is an irregular curve (if they followed Ohm's law it would be a straight line). The rectifying action is greater the steeper the characteristic is toward the axis of abscissæ at the point corresponding to the E. M. F. of the auxiliary cell, and the sharper its curvature at that point. If i = wing current and p = plate potential, then the rectifying power $= \frac{\delta^2 i}{\delta p^2}$.

The action of the Fleming valve is now described. The connections are as shown in Fig. 3. It does not differ greatly from Fig. 1. An oscillation circuit is inductively connected to the aerial. This is connected to the plate P, which is sometimes made in the form of a cylinder. The potential of the plate to the fila-

ment is adjusted by the potentiometer *r*, thus making use of the same battery which is used to heat the filament. This is equivalent to putting a certain exactly adjustable steady voltage in series with the telephone receiver and the wing circuit, and superimposing on this an oscillatory voltage derived from oscillations set up in the condenser circuit. If now, the slider on the rheostat *r* is adjusted to such a position that the voltage from plate to filament is at a point of sudden curvature on the characteristic curve, oscillations set up in the condenser circuit by induction from the aerial will cause a series of variations in the wing current, all in the same direction. Therefore a sound will be heard in the telephone.

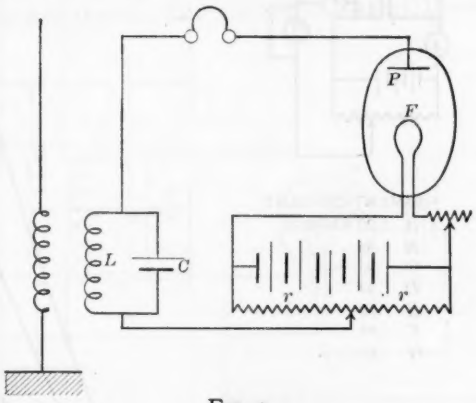
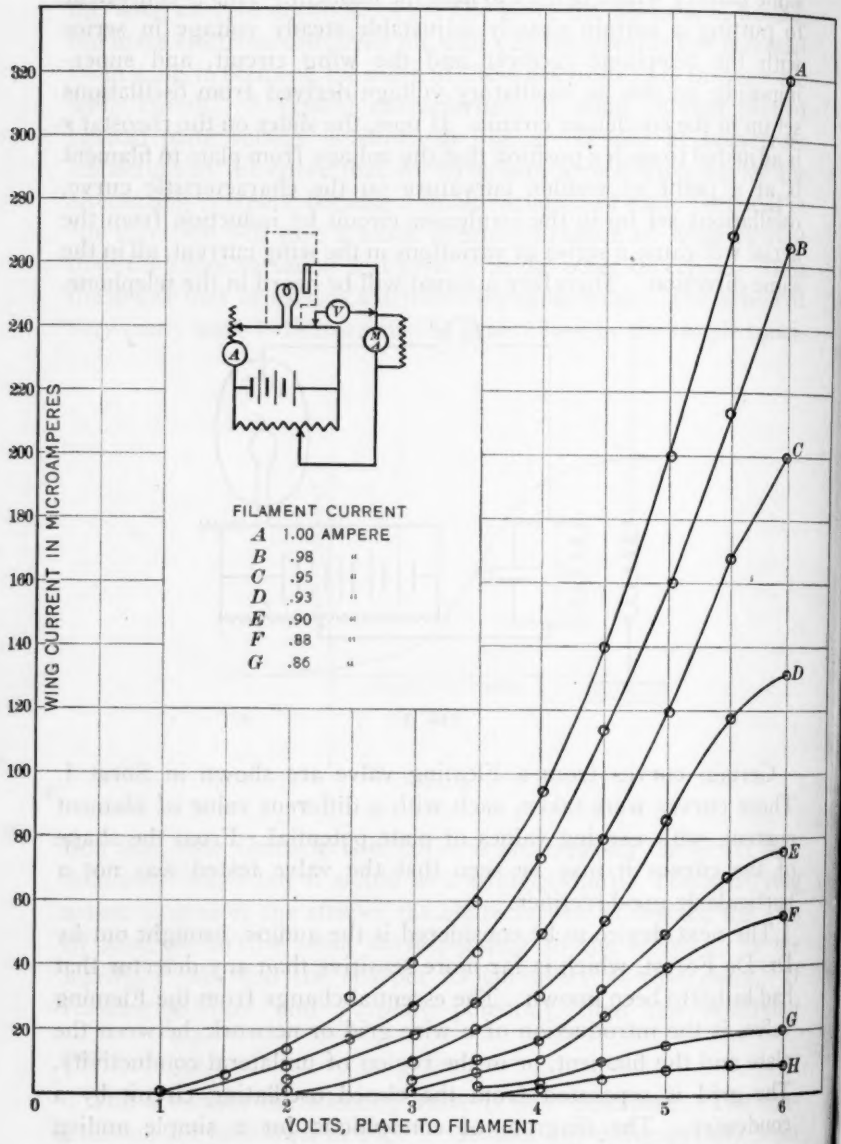


FIG. 3

Certain curves from a Fleming valve are shown in Sheet I. These curves were taken, each with a different value of filament current, with varying values of plate potential. From the shape of the curves it may be seen that the valve tested was not a particularly good rectifier.

The next device to be considered is the audion, brought out by Dr. De Forest, which is far more sensitive than any detector that had hitherto been known. The essential change from the Fleming valve, is the introduction of a wire grid or network, between the plate and the filament, or in the region of unilateral conductivity. The grid is separated from the closed oscillating circuit by a condenser. The diagram of connections for a simple audion circuit is shown in Fig. 4. The grid acts as a gate to control the direct current in the wing circuit by changing the potential from plate to filament.



SHEET I.—Characteristic Curves of a Fleming Valve

This action will be described in detail later, but in order to understand it better, it is desirable to consider first, the action of the audion as a simple valve; that is, with the oscillating circuit removed, and the grid connected to the plate so that it acts simply as a part of the plate. This latter is necessary because, if the grid is left simply disconnected, the bombardment of electrons will soon give it a negative potential with respect to the filament, since the electrons which enter it cannot get off; but this negative potential will act to repel the electrons coming that way, that is, toward the positive plate, so that less of them will get to the plate and the bulb will have a different characteristic from what it would have if the grid were not there. The curves in Sheet II were obtained

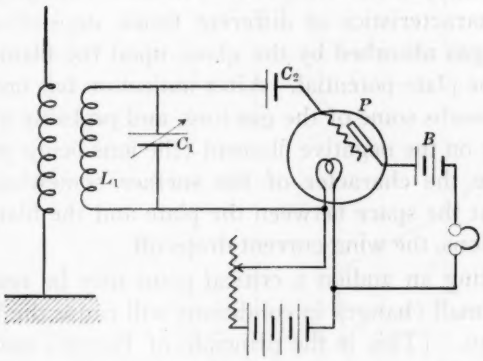


FIG. 4

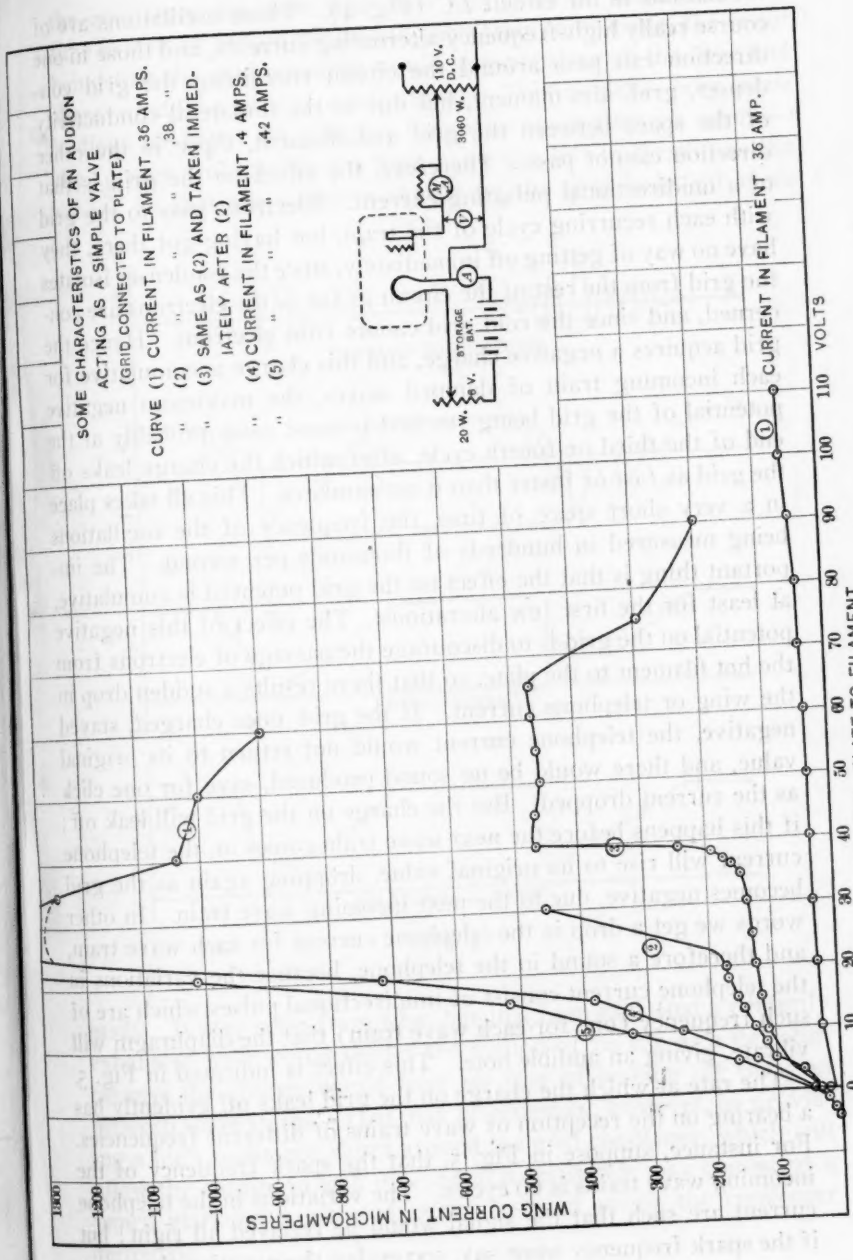
with an audion connected as above described. Examination of these curves shows a development that, up to this point, has not been considered. At a certain point, as the potential from plate to filament is varied, there is suddenly a very great increase in the wing current, which goes up to a maximum and then decreases. This effect is due to the ionization of the gas remaining in the bulb.

We have considered up to this point the vacuum in the bulb to be perfect; whereas, as a matter of fact, it is not perfect at all, and to the effect of the molecules of gas remaining in the bulb, must be attributed all the irregularities and eccentricities in the behavior of audions and Fleming valves in general. Also it follows that the better the vacuum, the more reliable and predictable is the action of an audion.

The sudden increase in the wing current shows the point at which the gas molecules break down under the electron bombardment, that is, the point at which they lose electrons and become ions. As is quite generally known, an ionized gas is a very good conductor of electricity, so the space between the plate and the filament has suddenly changed from a very good insulator to a very good conductor. So now, in the wing circuit, we get an ordinary electric current due to the battery *B*, which is much greater than that due to the electron stream from hot filament to the cold plate. A visible, physical manifestation of ionization is the formation of a light blue haze in the bulb; sometimes "invisible ionization" takes place without the blue haze appearing. The exact point at which ionization occurs is, for a given bulb of the ordinary quality, an uncertain one. The same bulb may show quite different characteristics at different times, depending upon the amount of gas absorbed by the glass, upon the filament current, and upon the plate potential. After ionization has once occurred, the glass absorbs some of the gas ions, and probably also, some of them collect on the negative filament (the ions being positive) and thus change the character of the surface somewhat. The net result is that the space between the plate and the filament having now fewer ions, the wing current drops off.

In operating an audion a critical point may be reached where extremely small changes in conditions will cause the blue haze to come and go. (This is the principle of Pierce's mercury vapor relay.) Sometimes an audion may be adjusted just below the ionization point, and then signals produce ionization. This gives very loud signals, but is, of course, erratic. In general, the more electrons there are passing to the plate, and the more gas molecules left in the bulb, the sooner ionization takes place. In using the audion, the operating point is always below the point of ionization.

The action of an audion as a detector of damped waves is quite different from the simple valve action just described. Referring to Fig. 4 it will be noticed that a condenser is connected in series with the grid. The purpose of this is to isolate the grid from the rest of the oscillating circuit, in so far as the passage of electrons is concerned. Suppose the audion to be in the normal operating condition, the filament heated by a battery, and such a potential between plate and filament that a steady electron current flows in the wing circuit. Incoming oscillations on the aerial will set up


SOME CHARACTERISTICS OF AN AUDION
ACTING AS A SIMPLE VALVE
(GRID CONNECTED TO PLATE)
CURVE (1) CURRENT IN FILAMENT .36 AMPS.
(2) " " .38 "
(3) SAME AS (2) AND TAKEN IMMEDIATELY AFTER (2)
(4) CURRENT IN FILAMENT .4 AMPS.
(5) " " .42 AMPS.
110 V. D.C.
3060 W.
STORAGE BAT.
20 W.
6 V.
PLATE CURRENT IN MICROAMPERES
POTENTIAL, PLATE TO FILAMENT VOLTS
CURRENT IN FILAMENT 36 AMP.

SHEET II

oscillations in the circuit *LC* (Fig. 4). These oscillations are of course really high-frequency alternating currents, and those in one direction can pass around the circuit containing the grid condenser, grid, and filament, but due to the unilateral conductivity of the space between the grid and filament, those in the other direction cannot pass. Therefore, the effect on the grid is that of a unidirectional pulsating current. Electrons pass to the grid with each recurring cycle of the train, but having got there, they have no way of getting off immediately, since the condenser isolates the grid from the rest of the circuit as far as the electrons are concerned, and since the cold grid cannot emit electrons. Hence the grid acquires a negative charge, and this charge is cumulative for each incoming train of damped waves, the maximum negative potential of the grid being reached in most cases probably at the end of the third or fourth cycle, after which the charge leaks off the grid as fast or faster than it accumulates. This all takes place in a very short space of time, the frequency of the oscillations being measured in hundreds of thousands per second. The important thing is that the effect on the grid potential is cumulative, at least for the first few alterations. The effect of this negative potential on the grid is to discourage the passage of electrons from the hot filament to the plate, so that there results a sudden drop in the wing or telephone current. If the grid, once charged, stayed negative, the telephone current would not return to its original value, and there would be no sound produced, save for one click as the current dropped. But the charge on the grid will leak off; if this happens before the next wave train comes in, the telephone current will rise to its original value, dropping again as the grid becomes negative, due to the next incoming wave train. In other words we get a drop in the telephone current for each wave train, and therefore a sound in the telephone, because the variations in the telephone current consist of unidirectional pulses which are of such frequency (one for each wave train) that the diaphragm will vibrate, giving an audible note. This effect is indicated in Fig. 5.

The rate at which the charge on the grid leaks off evidently has a bearing on the reception of wave trains of different frequencies. For instance, suppose in Fig. 5, that the spark frequency of the incoming wave trains is 60 cycles. The variations in the telephone current are such that the signal would be received all right; but if the spark frequency were, say, 500 cycles, the negative charge on

the grid from the wave train that first came in, would not have time to leak off before the second wave train came along, the result being that the grid potential would stay negative all the time and there would be only a weak signal. This explains why some audions are better for a higher frequency spark than are others—the former probably have a little more gas left in them than the others, so that the negative charge on the grid leaks off more

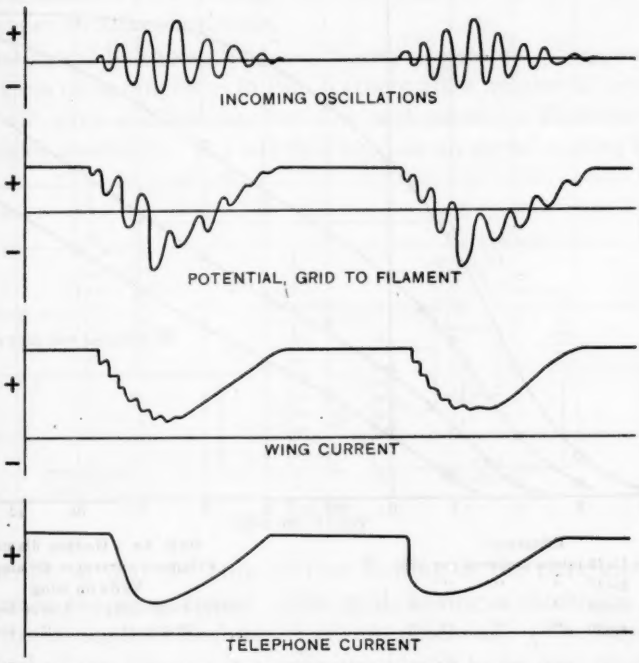
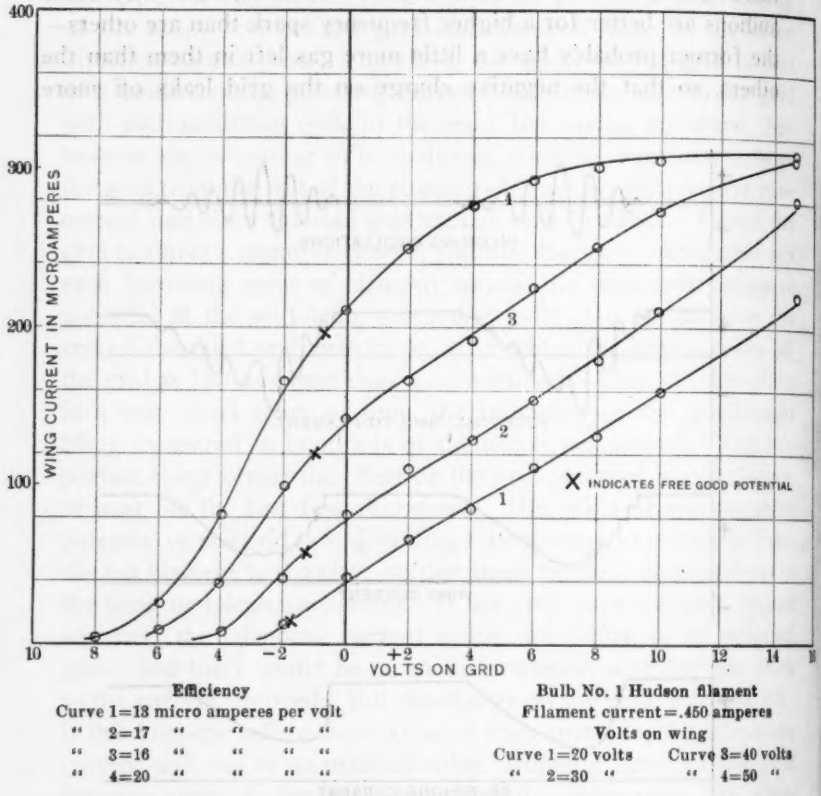


FIG. 5

easily. It may seem from what has just been said, that a perfectly exhausted bulb would render the audion of no use as a detector, because the charge would have no way of leaking off the grid between wave trains. That may be remedied, however, by providing a high resistance shunt around the grid condenser, which will allow the charge to leak off. Such a resistance may consist of a pencil mark on a piece of paper fastened across the condenser terminals.

In Sheet III are shown some characteristic curves of an audion, obtained by varying the potential of grid to filament. These curves are important, for upon the potential of grid to filament, and its



SHEET III.—Grid Potential Wing Current Audion Characteristics

effects upon the wing current, depends the value of an audion as a detector of damped waves.

THE OSCILLATING AUDION

Referring to Fig. 5, and the description above, it is seen that the wing current has in it certain pulsations, due to the variations of grid potential, of the same frequency as those in the oscillating circuit. In other words, the wing current may be considered a direct current with a superimposed alternating current of high

frequency. No use is made of the superimposed high-frequency alternating current in the audion circuit for the reception of damped waves, as described above; but by making use of them, by certain circuit connections, an audion may be made to have additional and extremely useful properties, and to act not only as a detector, but as a receiver of undamped waves, as an amplifier, and even as a generator of undamped waves. To Dr. E. H. Armstrong of the research laboratory of Columbia University, is due the discovery of the fact that the audion will oscillate with the proper circuit connections.

First it will be shown how oscillations are set up. Suppose we have a circuit arranged as in Fig. 6 (there are a number of circuits that will give oscillations, but this will serve to illustrate the principles involved). We will first suppose no signal coming in on

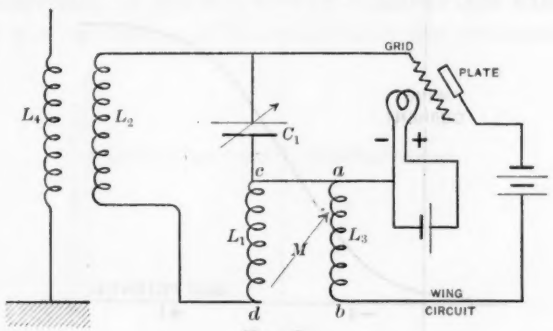


FIG. 6

the aerial, so that the only current flowing is the pure electron current in the wing circuit. The grid, having a discharge path back to the negative filament, is at zero potential. (The negative terminal of the filament is always considered to be zero potential and the reference point for the circuit.) The operating characteristic of an audion is of the general form shown in Fig. 7, the grid in this case being normally at zero potential, as just explained. Now we must conceive of the electron current as being due to the passage of a definite number of electrons, so that the current is not absolutely steady—a few more electrons may pass in one second than in the next. So we can suppose a very slight drop in the wing current. The inductance of the coil L_3 will now act to produce a counter or reactive E. M. F. opposed to the change, *i. e.*, in the direction *a*-*b*. The lines of force from L_3 threading L_1, will cause

in this coil an E. M. F. in direction opposite to the counter E. M. F. in coil L_3, in other words in the direction *d-c*, so that current will flow in that direction. This means that electrons will pass in the other direction and to the grid which will therefore acquire a negative potential. But a negative potential on the grid will cause a further decrease in the wing current, which will in turn cause a further negative potential on the grid, and so on until the grid potential has built up to such a point that any further increase of negative potential on it will not cause a decrease in the wing current; and then the action stops (Fig. 7). By exactly analogous reasoning it may be shown that a slight increase from any cause in the wing current will tend to build up the wing current still more

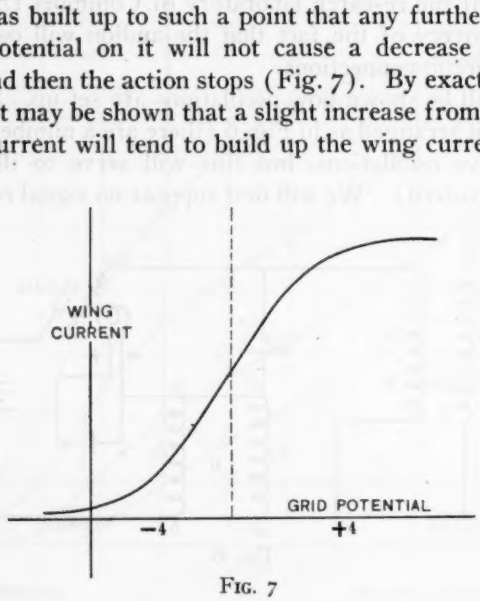


FIG. 7

until the flat part of the curve of grid potential and wing current is reached.

The circuit, therefore, has the property of instability. That is to say, whether the wing current be increased or decreased the effect tends to augment the cause which produced it. One other condition is necessary before the system will oscillate; it must have a natural period. This is given by the condenser C_1 (Fig. 6), whose effect has up to this point in the discussion been ignored.

In the above described action, as a decrease in wing current has through its effect on coil L_3 and hence on L_1, caused the grid potential to become negative, and thus caused the wing current to drop still more, it has also charged the condenser C_1. When the wing current has decreased as far as it will go, due to the shape of

the wing current—grid potential curve, then the action tends to stop, because the wing current now being steady, there is no change in the magnetic lines and hence no induced potential in L_1 and L_3: at this time, however, the condenser C_1, has a chance to discharge through the circuit containing L_2, and L_1; this sets up a current in L_1, in the direction opposite to that in which the current was previously flowing, and this by mutual inductance through L_1 and L_3 sets up a potential which increases the wing current. At the same time in discharging the condenser, the potential of the grid is brought to a higher value again, which also tends to cause the wing current to increase. So now we have the whole action started again, this time in the reverse or positive direction. In other words the system is oscillating.

It is interesting to examine certain relations that exist. The period of the oscillations will depend upon the constants of the

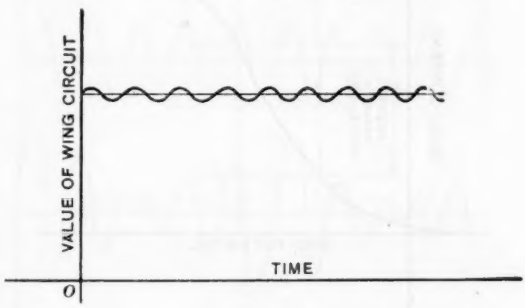


FIG. 8

circuit, and is (approximately) $2\pi\sqrt{(L_1+L_2)C}$. The effective value I, of the current flowing in the local or "tuned" circuit $= 2\pi fCE_c$, where E_c is the voltage across C_1 and C, its capacity. If we call the E. M. F. induced in the coil L_1 by the action of the wing current fluctuations in L_3, the generated E. M. F., or E_{gen}, we also have the relation for an ordinary circuit containing L, R, and C; that is, $I=\dfrac{E_{gen}}{\sqrt{R^2+\left(\omega L-\frac{1}{\omega C}\right)^2}}$. But since this circuit is oscillating in its natural period, $\left(\omega L-\frac{1}{\omega C}\right)=0$. Therefore, $I=\frac{E_{gen}}{R}$. Also we may say that $E_c=E_{grid}$, because the grid is in parallel with the condenser, and the grid potential varies with the charge on the condenser.

The wing current may be considered a direct current with a superimposed alternating current (Fig. 8). The E_{gen} may be equated to $2\pi fMI_{alternating}$, where M is the mutual inductance between the grid and the wing circuits, and $I_{alternating}$ is the alternating part of the wing current.

From these relations it may be seen that in order to get an E_{gen}, we must have fluctuations in the wing current, and in order to get these fluctuations we must have certain fluctuations in grid potential which depend on E_{gen}. Thus we have an interacting system, and in this system certain conditions must be fulfilled before there can be oscillations. An idea of this may be obtained from

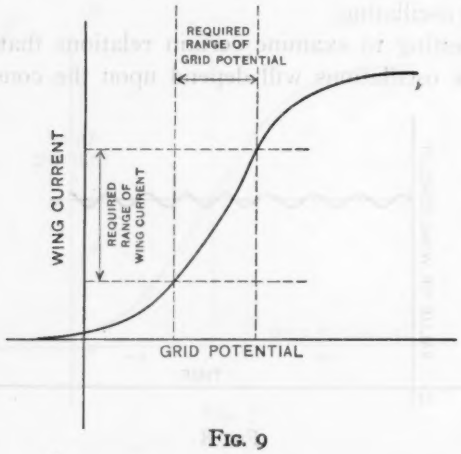


FIG. 9

Fig. 9. Also we can control the oscillations by varying either M, R, or C, as will be shown. The M must be large enough to give an E_{gen}, which will give a grid potential of a value sufficient to cause a fluctuation in wing current large enough to give the E_{gen} necessary to repeat this cycle. The capacity C_1 must be small enough so that the E_c, and hence the grid potential will have a sufficient value to cause the necessary change in the wing current to react through M to cause the E_{gen}, necessary to repeat the cycle. The R of the circuit is very difficult to obtain exactly; it depends upon the ohmic resistance of coils L_1 and L_2, the resistance of condenser C_1, the resistance of the circuit containing L_3, the resistance of the inductively connected antenna, and the resistance in the conducting direction of the circuit through grid and filament. If R is de-

creased, as by decreasing the coupling between the local and the antenna circuits, or by exhausting the gas in the bulb more completely, then since $I = \frac{E_{gen}}{R}$, the I will increase, and thus produce an increase in E. But as the oscillating condition depends on whether E_{gen} is sufficiently large, this shows a means of controlling that condition.

Having now an oscillating audion, how does that enable us to receive undamped wave signals? To answer this question, suppose we have a signal coming in on the aerial (undamped waves).

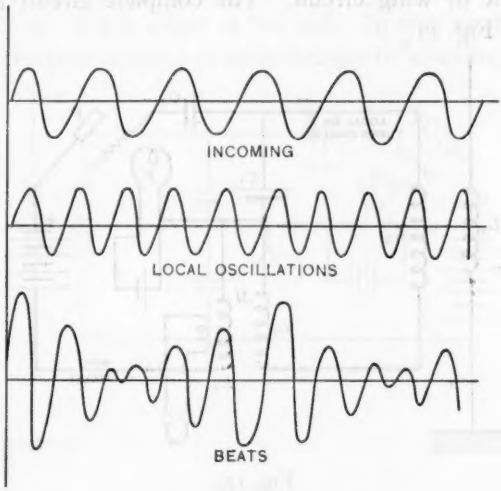


FIG. 10

Referring now to Fig. 6, by mutual induction between L_4 and L_2 these oscillations are impressed on the tuned grid circuit, so that in this circuit we now have oscillations of two frequencies—one due to the signal, and the other due to local oscillations above described. The result is a series of beats. (Fig. 10.) The two sets of oscillations are each of radio frequency, and controlled by the frequency of audion oscillation, and each is of itself of too high a frequency to be audible in a telephone placed in the wing circuit. With the connections of Fig. 6 the beats, although of lower or audible frequency are still inaudible, because the oscillations which combine to make the beats are of too high frequency to be heard. In other words, simply combining two high-frequency

vibrations so as to produce beats, the beats being of a frequency within the audible range, will not of itself produce sound; this may easily be demonstrated with tuning forks. What must be done is to combine the oscillations into a series of lower frequency pulses, one pulse for each beat. This is done by the addition in the circuit shown in Fig. 6, of a grid or "stop" condenser, C_2, which acts exactly as already described, for the grid condenser in the audion circuit for the reception of undamped waves, except that in this case the cumulative action is between beats, instead of between cycles, and its effect is to give a series of unidirectional pulses in the telephone or wing circuit. The complete circuit then, is as indicated in Fig. 11.

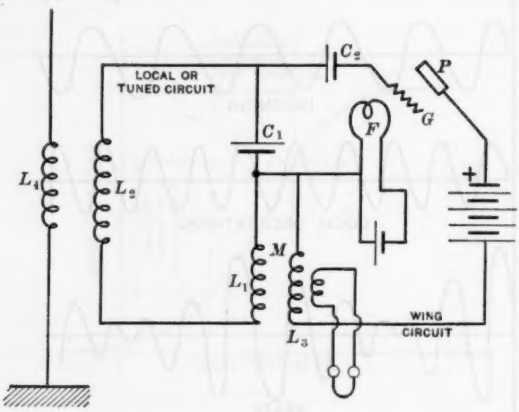


FIG. 11

The effect of an oscillating condition upon the average value of the wing current, when a grid condenser is not used, as shown by the deflection of a D. C. galvanometer, depends upon the part of the curve of grid-potential against wing current at which the audion is being operated. At the lower part of the curve the net increases are more than the net decreases so the average value of wing current will increase. Similarly, at the upper part of the curve the net decreases are more than the net increases, so that the average value of the wing current will drop; while at the middle part of the curve the net increases about equal the net decreases, and the average value as shown by a D. C. galvanometer does not change. A hot-wire meter, however, which reads effective values (the square root of the sum of the squares) of direct current and

superimposed alternating current, will show an increase due to the latter. Also a sound will be heard in a telephone receiver in the wing circuit, if the pulsations are of audible frequency.

When a grid condenser is used the effect of oscillations is always to cause a drop in the average value of wing current, because the grid collects electrons all the time, and the effect of this is to lower the electron stream to the plate.

In Fig. 12 is shown another method of connecting an audion to make it oscillate. In this method the only additional apparatus needed besides that needed for an audion used as a detector, is a condenser, C_3, which must be large in comparison to the tuning condenser C_2, or of the order of .01 mf. In this method use is made of electrostatic instead of electromagnetic coupling, to effect

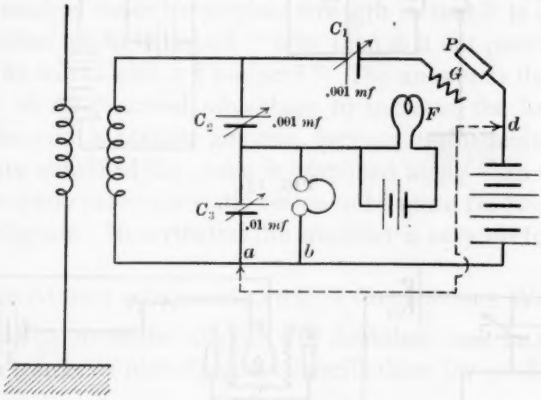


FIG. 12

the transfer of energy back to the closed circuit and so produce oscillations. The variation of potential across the telephone, which is in series with the wing circuit, affects the potential to which the condenser C_3 is charged; but this determines the potential to which the condenser C_2 is charged, and a variation of this potential varies the grid potential, which in turn affects the electron stream and hence the wing current, the variation of which started the above cycle. Another function of the coupling condenser C_3, is to afford a path around the telephone for the high-frequency oscillations to travel over, since the telephone windings offer too great impedance to them. Instead of simply shunting the telephones, the connection may be made so as to shunt the batteries as well, as indicated by the dotted lines; in other words a is connected to d instead of to b. It will be noted that condensers C_2, and C_3 are in series. Therefore

a change in C_3 will have little effect on the tuning of the closed circuit, since the condenser C_2 is so much smaller and has more effect on the total capacity of the circuit than C_3. (Condensers in series act like resistances in parallel in that the smaller one has the greater effect on the total.) As before stated the capacity C_2 must be small in order to obtain oscillations, C_3 must be large enough to have little effect on the tuning and to offer low im-

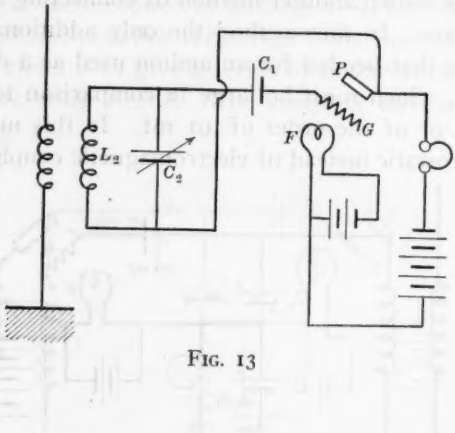


FIG. 13

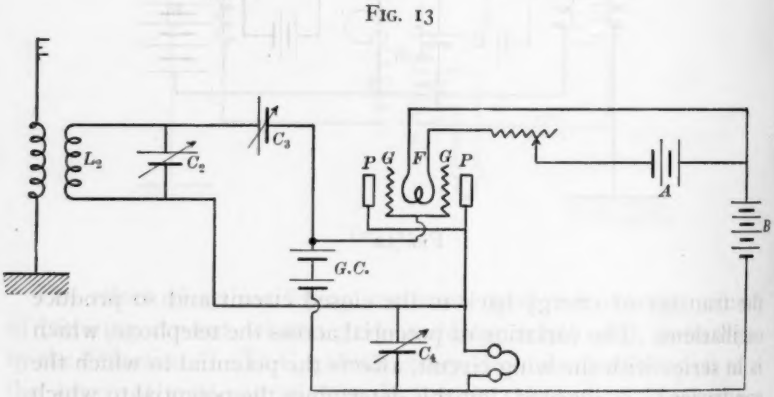


FIG. 14

pedance to high-frequency currents, and must be sufficiently small that reasonable changes in potential in the telephone circuit will charge it, without a relatively large charging current flowing in from the wing circuit.

Fig. 13 shows a connection given by De Forest. The telephone cords must have enough capacity to pass high-frequency oscillations, for this method to work.

Fig. 14 shows another connection given by De Forest.

THE AUDION AS AN AMPLIFIER

Instead of using high-frequency oscillations induced from an aerial, to change the potential on the grid, and thus to cause variations in the wing current, it is possible to use the pulsations in the wing circuit of another audion (or for that matter the pulsations of an ordinary detector circuit). But as the original oscillation has been used to produce an effect in the telephone circuit which is proportionally large, so if the pulsations in the telephone or wing circuit are used to change the potential on the grid of a second audion, the resulting change in the second wing or telephone circuit is still greater. Two or three audions may thus be used in cascade, and an initial signal too weak to be read may be increased to several hundred times its original strength so that it is quite loud. The question might be asked, "Why then is it not possible to talk around the world with a 5 kw. set?" The answer is that at present it is of no practical advantage to increase the loudness of signals beyond a certain amount, because unfortunately, when signals are amplified the static is amplified along with them, and indeed in many cases the static seems to be more readily amplified than the signals. Nevertheless the amplifier is very useful.

THE AUDION AS A GENERATOR OF CONTINUOUS WAVES

The audion or similar devices will doubtless soon be commonly used as a source of high-frequency oscillations for sending.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

AMUSING FIFTY THOUSAND MEN

ANOTHER OPPORTUNITY FOR GOVERNMENT CONTROL

By LIEUTENANT FITZHUGH GREEN, U. S. Navy

We have entered an era of unprecedented military activity. End of the war will by no means assure the consummation of its aim. We may stop only for a second wind. Compulsory military education shall be found necessary. The navy we now call temporary cannot shrink, but shall grow like a wild vine. To the government shall turn men and boys, and even women, for guidance and education. To teach them to fight will prove but a fraction of the responsibility. "Learn to live" shall read the first precept wherever arms be taught . . . . And so it follows that we teachers must study and perfect our methods; must know intimately each peril, injustice, and ugly cruelty, as well as all the joys and advantages of the discipline we stand for.

There is an ancient tale about three old women who spun. One footed the treadle; one licked the yarn; one thumbed the thread. So zealous and unremitting was their labor that by the time of the tale's making the first had an enormous foot; the second a tongue like that of a cow; and the third a thumb that passed all human understanding not in on the secret.

The moral of that tale is *one-sidedness.*

If a man is one-sided he is deformed. If deformed he is usually a cripple. We cannot afford to cripple men in the navy—men who now of all times must be at the very pinnacle of physical and mental preparedness. Yet if we keep them forever aboard grinding, drilling, or worst of all just waiting, they shall become as one-sided as the spinners.

You who wear the football N's, don't you remember how in the old days we arrived in Philadelphia, rode in swift kingly limousines to our hotel; how we laughed and played, took a walk and

saw a show; how old Scotty McMasters called up the bunch and said (I can't spell the way he said it), "I ken, lads, ye've worked these months. Play hard to-day, play hard . . . . and 'tis to-morrow ye'll fight like men!"

Scotty's teams were good ones. He taught us to play and to fight. But did he and all the other instructors we had teach us to teach others to play and fight? For that has been our problem this long-to-be-remembered summer; to develop 50,000 men into first class, A-1, bring-home-the-bacon scrappers.

The fighting part is not so difficult. We have drill and regulation books, target practice instructions, and the manifold lessons of the war. The last named are our greatest help. Show a healthy man how to fight, give him a good reason, and he will produce material for the war correspondents faster than they can write it, and so hot it will scorch their mud-splattered pads and pencils.

The playing part has been our bugbear. Amusement of military forces is an old problem with a new solution every day in the century. So many elements enter in, from the kind of weather to the price of ice, that no constant set of conditions ever prevail. Volumes there are on the subject from Mr. James' Psychology to plain Jim Hoyle. But beyond a few simple fundamentals experience and common sense are the best and only guides.

Of these a vast fund fortunately lies in our fleet leaders. One may say, however, that recently they have been up against it. When the battleships came north in the spring the mouth of a tidal inlet was selected as a rendezvous. While the channel was of sufficient width to permit comfortable anchorage without overworking the running boats, it was certainly too narrow for big ship convenience. Surrounding country was low and in many places swampy. Bedraggled farmhouses squatted here and there half buried in an almost tropical vegetation. Clearings were few and far between. The land itself was not unlovely but there was an intangible unkemptness about it that suggested hookworm.

Further up the inlet narrowed. On each side stood guard a steamboat wharf and a small warehouse. Back of them like a poor man's brood cringed a handful of country houses, one hostelry, and a dozen negro hovels. Both villages boasted a rural store, you know the kind—calico to cranberries—and one had a courthouse of which the walls were decorated by names and dates reaching back into the reconstruction period.

Here must our men find diversion. No railroads, no sewers, no theaters, no restaurants, no stores—not even a fly-specked soda-fountain! Since we were at war only a small percentage could go on furlough. Yet with new ships, new recruits, new missions, an extraordinary amount of work was demanded of the personnel—so much work, in fact, that recreation was from the outset a consideration worthy of the most careful scrutiny.

At first the men ran loose. Of course regular patrols and beach guards were established and ordinary rules of sanitation put into effect. But no real check was laid on the liberty parties. This course had two advantages: First, it was the quickest way of ascertaining the resources and possibilities of the country from

A LANDING PARTY, U. S. NAVY

a naval point of view; secondly, no better opportunity could have been afforded the natives to discover what they could expect in the way of demands for transportation, food, lodging, and entertainment.

Results were immediate. The memory of the first Saturday liberty has been perpetuated in the orders and instructions resulting therefrom. The trouble was less from actual misdemeanors than of downright inconvenience. As the country had already been canvassed by officers' stewards there were no roadside mug-ups. Town was hot and dusty and at the same time coldly inhospitable. Potato patches made poor hangouts, and the farmers who watched over them were decidedly unpleasant. Undiscouraged the bluejackets trudged on. An oasis loomed up. It

was level, grassy, full of shade trees, and unpopulated except by—tombstones. A baseball diamond was laid out. "Batter up!" . . . .

Next day the news was out. A graveyard had been desecrated. "Liberty men ashore were guilty of conduct which reflected discredit upon the navy and the naval service." Infinitely more profane was the speech in which men embodied their resentment. But there was justice in their querulous complaints. And even among the authorities "what had we best do?" was the anxious interrogation.

The Navy League provided an answer. Clear of the town and on a breezy elevation that kindly society secured about 200 acres of open land bordered on one side by the river beach. Officers sarcastically suggested a sheep pasture when it became known that liberty men were to be corralled within a given space. "The very restraint will spoil their fun," said one.

"But there will be no restraint," was the answer.

"Then how are you going to keep them inside?"

"Simply by building and making our own amusement park so attractive that no others will be able to compete."

Which was exactly what happened. The field was first laid out in baseball diamonds according to battleship divisions. Each diamond had it's own backstop. Some had bleachers in one form or another. Improvements could be made by those concerned. The ground was rolled and trimmed in professional style. Regular schedules were planned and played and bets collected according to man's ancient privilege.

Theoretically this arrangement should have fulfilled all requirements. Through the week the navy worked and fed its men, even gave them movies and canteens. On Saturdays and Sundays "Navy League Field" was the playground. The balance of task and game was scientifically standardized by assigning definite recreation days and hours to the battleship forces and encouraging crews to take advantage of all liberty.

Practically, however, there remained unsolved the most potent problem in all pastime. "Count not men but stomachs," said a great tactician. Men may forget home, family and religion; may overlook courtesy and kindness, and outgrow hatred. But occupation that obscures appetite or thirst is occupation indeed!

And so canteens came. Through the staff officer in charge applicants were granted leases for small shops to be erected on the grounds at the owner's expense and risk. Buildings were arranged along two sides of the land with a central pavilion between three contiguous diamonds. There were five canteens for soft drinks and sweets, one quick lunch counter, one kodak shop, a shooting gallery, news counter, and a watermelon stand. Their combined business was a roaring, snorting, silver-clinking success.

Appearances to the contrary, this strange array was not incompatible with our personnel. Recruits are mostly in their 'teens. They have stomachs of ostriches and appetites of wolves. Their thirst on a scorching July afternoon may be accurately compared to the parched dryness of Sahara. They run and talk and generally *agisticate* until a drink per man per hour becomes more than luxury—with many it is (so they declare) a vital necessity.

One afternoon on a calm inspection I suffered under the blazing sun as one lost in Death Valley. After several rounds of "Belly-Wash" I fell in with the agent of Apple-O, the *dernier cri* of prohibition beverages. "How many bottles do you sell here on a week-end?" I asked, mostly out of curiosity.

"Guess," he replied, shifting a shredded two-fer.

"Well, we have more than 6000 men ashore this afternoon. They have six kinds of soft drinks to choose among. Perhaps twice an afternoon they visit the canteen. I say roughly 4000 bottles."

He stepped closer. "I can't exaggerate," he said, "because 5 per cent of what I make goes to your fleet athletic fund. Of one single kind of drink we sold yesterday and to-day 18,000 bottles."

I really gasped. "Then you ought to be a millionaire by the end of the summer," I managed to reply.

"Seems so, alright," he continued. "But here's the game. Breweries are rebuilding their plants to suit prohibition. Installation of new machinery and laboratories for developing healthy and appetizing drinks absorbs an enormous amount of capital. Times are unsettled. They dare not let the investments run. Consequently wholesale prices of all bottled products are equal to counter prices. On Apple-O, grape juice, ginger ale, Bevo and near beer, we make only by the bottle rebate, *i. e.*, what is paid us for the bottles returned. For instance we buy a case

for $2.40. We sell it for the same amount, then collect and return the empties for 70 cents or about 3 cents apiece. In old times beer netted over 100 per cent. Just as soon as the brewers square up on their new plants profit on this soft stuff will jump. Already some of it's good for as much as 40 per cent outright to the little fellows."

He stopped and thought for a minute. Suddenly he swung about. "Why don't you navy people do this for yourselves? Here you have maybe 50,000 men. If they're not here they're at New York, or Guantanamo, or Narragansett. Even aboard ship and in the navy yards you buy our bottled goods, cakes and candy—whole trainloads of them!"

Then he luffed. I imagine he thought I might take him seriously and start a navy fruit juice factory. I did take him seriously; so much so in fact, that notebook in hand I started for a tour of the grounds.

I made the week-end, Saturday and Sunday, my unit of time. In that space besides the 18,000 bottles of Apple-O, I found there were sold to the bluejackets approximately 10,000 of imitation (non-alcoholic) beer, 3000 grape juice and 5000 of other kinds of drinks in the package so to speak, not to mention orangeade, lemonade and soda-water in bulk. Counting outside sales the total was about 50,000 bottles. With ginger-ale and Bevo at 15 cents, and Apple-O at 5 and 10 cents, the average was 10 cents per bottle, or $5000 taken in on soft drinks alone.

Watermelons also made a good profit. They came from Georgia—northern crops delayed by cold weather—via Norfolk at 10 cents to 25 cents apiece. They sold to the sailors as high as $1 for a single melon. About 1000 were sold in an afternoon.

Cakes, candy, tobacco and chewing gum were more difficult to estimate. By checking the most popular items I made a list that totaled up to a little less than $4500. A great many articles such as souvenirs, post-cards, clothing and knick-knacks I was unable to calculate. The fact that the stock disappeared testified to the amount of money spent.

One proprietor was in great spirits on having completely cleaned out. "Had one broom left," he chuckled. "Sailor came, said, 'Gimme a grape-juice.' 'All gone,' I says. 'Some cracker-jack then,' he says. 'All gone,' is the only answer I can give. 'One broom left,' says I; 'nothing else.' The sailor planks down his

money. 'I'll take it,' he says; and he did!" Which illustrates the man-o'-wars-man's irresistible desire to be rid of his hard earned "iron-beans."

I spent a few minutes at the shooting gallery. The owner sold oranges and lemonade on the side, probably to hold his trade. He had such a nice little place I asked him about the cost of lumber. To my surprise less than $100 worth of tongued spruce had gone into the pistol palace. Passing the time of day, "How many rounds an afternoon?" I finally slipped in. "Oh, 25,000 or so," was the nonchalant response. At the same instant my eye caught a sign: "Learn to shoot—three shots for 5 cents." For a moment I tried to figure the profit, but could only remember my confusion in attempting to envisage the 50,000 gross of bottles the fruit juice company orders at one time.

The lunch counter was the one place whose middle name was not Bonanza. Its meager profit for five hours work was but $250. I learned that the right sort of equipment would cost $2000 with $25 a day for help. No doubt though, the manager concluded, in the spring and fall a "grub joint" would pay for itself about once a week.

There were many other ways for the men to spend their money. Old broken down plow horses were saddled and rented for $3 an hour. I interrupted one skinflint who "let the boys take his rig" for $4 a passenger, or $20 an afternoon. Fortunately—even for the man, who must some day account for his sins—the poor beast died. Reasons for the tragedy are less obscure when one remembers that the G. E. Co. designs navy motors for 100 per cent overload to allow for unskilled treatment. Sailors and stables—the analogy is obvious.

Popcorn and peanut stands did a good business. Natives brought peaches and plums and even eggs. One enterprising woman tied her cow nearby for an advertisement and sold milk shakes faster than she and her pretty daughter could mix them. From jitneys to kodaks and bananas everything went with startling ease and profit.

By this time my notebook was full and my brain in a fever. I had discovered a gold mine! I pictured myself a second Henry Ford, making cherry flips instead of flivvers, candy and ice-cream cones instead of carburetors, and spreading rich bonuses among my old friends in the navy.

I sat down and checked my columns over. There was no mistake; $25,000 an afternoon was being spent for not more than $10,000 worth of goods. Profit 150 per cent . . . . War Babies weren't in it!

Then my mood changed. I realized that the fleet was getting stung for entirely unnecessary expense. I began to figure the proposition from a government-control point of view. Suppose on the land recently acquired at Hampton Roads the government saw fit to build and equip a canteen factory. Let the products include soft drinks, cake, candy and tobacco. Confine distribution to the navy, and possibly the marine corps and coast artillery. Limit the investment to $1,000,000 with an assumed value slightly above the recent treasury notes, say 4 per cent. Perhaps carry the co-operative idea into the Service by suitable bonds. Call depreciation and repairs (all navy work) another 4 per cent, and operating expenses 7 per cent, making a necessary gross debit of 15 per cent. In other words plan to operate on $150,000 a year cash.

At first sight this sum seems absurd. From the brewer's side it is—slightly. But he operates. We would co-operate. He splatters the countryside with bill-boards and posters. "Drink Squelch's Grape Whizz" profanes our loveliest hills and dales to the tune of $50,000 a series. Advertisements in the big magazines, "Million-a-year" circulations, run into tens of thousands of dollars. One manager with his center of buoyancy marked by a 5-caret spark dilated on these publicity coups. "Advertising campaign, eh!" he snorted at my naive inquiry, "Why, young fellow, it costs more to put my pop on the counter than it does to pull a president into the White House—and *we* face a re-election every summer!" He mopped his apoplectic countenance. "I can prove it too." He did; he had the certified statements.

Who pays these campaign bills? The consumer of course, we among the rest.

Besides not advertising, this naval canteen factory would be almost free from freight and transport bills. Not long ago one pacifist declared there was a running loss of $5,000,000 a year in empty cargo space on naval vessels, supply ships and tugs, doing coastwise service alone. No doubt there is something in this assertion. At any rate I happen to know that there is sufficient available room to carry canteen stores to all naval stations and fleet bases. Since routine duty of vessels so utilized would not be

disturbed no allowance need be made for freightage, save the actual handling.

Then there is the agent's loss. Did you ever see a real drummer hit your village? If he runs true to type Gaby Deslys has nothing on him for letting the old homestead know who's there. But it takes money—dollars for drinks, halves for hacks, and quarters for quick lunch preparations for "making a killing." A good man allows about 5 per cent of his gross sales in order to make them. That is, if he can stack up a $20,000 order he feels free to let his expenses for board, lodging, entertaining, advertising and general notoriety tally to $1000.

In the end who coughs up that $1000? . . . . The seaman second class at $38.50 a month, and others like him.

We would send simple lists to the sub-stations. Requisitions in customary form would eliminate all agent fees and expenses. Even banking nibbles would become unknown by simply transferring cash to another department at the navy yard or aboard ship. Or books could be drawn with detachable tickets in place of cash. Simply duplicating the accounts at the ship or yard, at the factory, and at the Navy Department would stand for all the labyrinth of account clearing without which the brewer could not work.

Factory superintendents, managers, foremen and help would be as necessary as in a civil plant. But much of the office work could best be done by our regular pay corps; and the experience of it would almost pay for their time. A kind of modified civil service would apply to the employees in the same manner in which our new armor plants will be organized. Broader and greater results, better hours, and less waste are the attractive possibilities in any industry owned and operated by the government, with no desire for profit, but only reduce its servant's living expenses and to improve the conditions under which he lives. The great incentive of individual rivalry would be fostered as in the great industries throughout our country by an effective bonus system with promotion based on individual results. Contrary to popular belief national competition would not suffer simply because there need be no conflict of territory. Having our laundry done aboard ship gives us immensely greater satisfaction with cleaner clothes and smaller prices. Yet shore laundries suffer no hardship, in fact are in no way affected by our thrift, simply because they have

enough customers without bothering with the navy. This must always be the case because the percentage of military forces remains small except in wartime when the private concern becomes of necessity a subsidized ally to the government.

I could describe a score of other ways in which consumer's cost of canteen stores could be cheapened. Tags, label and trademarks, when run into the millions, cost very appreciable sums. Patents, special rights, royalties, and litigation, not to mention specialized taxation increasing year by year, form no small part of the season's loss . . . . of course to be taken up in the selling price.

Let me roughly dissect the dollar bill our sailor lays on the counter. To the manufacturer's profit 10 cents; to wholesaler 5 cents; agent or middleman, or both, 5 cents; to retailer 15 cents; for advertising and transportation of both material and product, 8 cents; tags, labels, packing, and like items, 7 cents; by operation, depreciation, stock interest, dividends, and unavoidable losses (insurance, etc.) about 35 cents. *For actual raw material and conversion to what is sold 10 cents.*

That my figures are conservative was evidenced by two representatives of different establishments who agreed that their branch houses took up to 12 per cent and the soda-fountain man as high as 50 per cent or even 60 per cent of the gross profit.

In other words if the Secretary of the Navy called you up to-day and handed out a check for a million dollars, with factory rights on the Jamestown Reservation, some trivial allowance of pay clerks, a few paymasters, and the proper authority for untrammeled movement, you could be in full swing at the end of 10 months. You could supply shore canteens at 15 permanent bases and at least four transient stations. Granting each only four months capacity business for 20 per cent of the naval forces on the coast you could absolutely count on nearly $200,000 worth of business.

In a fleet of 40 major ships you would cater to canteens doing business at a minimum rate of $1000 a week, or $160,000 a month. Or, putting it another way, if every one of the 150,000 men who have spent no more than a dollar a month for tobacco, sweets, soft drinks, stationery, and other luxuries—many spend a dollar a day—your gross yearly revenue from their sweet teeth and tobacco tongues would be $1,200,000. In three years you could

return the secretary's million. You could establish and solidify a navy relief fund of prodigious catholicity. Most important of all you would at the very outset cut canteen prices no less than 40 per cent with such surety of quantity and quality that there could be no question of outside interference.

This factory idea is only the beginning of a gigantic reformation bound to come. Properly to control and to regulate the amusements of our men, and to handle contingent difficulties would be a task of like size with the manufacturing end, and nearly of equal profit not only to the government but to the soldiers and sailors for whose benefit the project first aims.

Take the uncouth jitney, that mud-daubed, cut-throat denizen of our liberty docks. Our naval experience with them has been wide as the land, long as the coast, and cruel as a rainy Fourth of July. To enliven the argument I can copy from my encyclopædic notes. Friday morning, August — at ——— I counted on or near the dock 63 ramshackled jitneys clustered across the wharf tail like so many suckling pigs. There were 48 Fords, 1913 vintage preponderating, 12 automobiles and 3 hacks. Most liberty men were bound for one of four destinations at fares $10, $6.50, $3 and 75 cents, respectively. The $10 trip could be done in three hours with five passengers. The 75-cent skip was a matter of half an hour, and I counted 11 bluejackets in one small Buick! Can you count the dollars?

What are the chances for a navy jit? Bought in bulk 100 Ford touring cars, fixings and traps, would form a full rolling stock at less than $40,000. I interviewed most of the jitney drivers, several of whom I had kept check on through the day. The highest day's earnings was reported by a wild-eyed Irishman who swore he had gleaned $105 from our lavish sailormen. He even showed me the money, and I saw no other way he could have gathered so much, vagabond that he was. A 12-year old lad took the booby prize with $10.25. The average of those who, except for the fact that they drove a jitney, seemed honest was about $50.

Suppose the navy had just bought 100 new cars, and each ship sent two drivers. The lot would have been paid for in two days! For an indefinite time thereafter the fleet could have ridden free of charge. Or, put on a par with the "Factory," in about six weeks time at *one-third* the regular fare the cars would all have

been paid for and the volunteer drivers have earned a handsome sum besides their diverting week-ends.

Movies naturally and cogenitally come next. On Navy League Field lived the glib dispenser of Mary P. in five reels—we wished it were 50. Afternoon finds him beset by ship operators. Morning smiles with him upon a luscious pile of 10-spots, one for each worn-out pock-marked film he has loaned overnight.

It may be tiresome, but calculate this celluloid Klondike: Any old reels will do, comedies, tragedies, weekly reviews (dating back to the fall of Sumter)—" posalutely absatively " anything will do!

Let's say we have a hundred of them. We can serve them out—one man could do all the work and raise a crop besides—say five a week to 40 ships. They can go direct or by express. In 20 weeks or about 5 months the gross receipts would come to $40,000. Then we resell the films, or perhaps let them out; and we balance books to find that the net feather lining of the little deal is about $30,000, or $72,000 a year! And here we sit in calm smugness while the widows wash clothes till their knuckles bleed. . . . .

So far I have dwelt upon only directly profitable possibilities. I have passed over ice and trucks and bumboats and lodgings, and a dozen other forms of easy pickings, because I have no exact figures with which to delineate them. But I wish to touch on several indirect matters of business and administration which very directly affect canteens and jitneys and other necessary nuisances.

Police and patrol parties come under this head. During my illuminative week as acting Chief of Police I had under me at different times about 150 officers and men. So far as my duty was concerned my experience was limited to almost entirely different conditions than we found in the neighborhood to which the work had been assigned. Yet I feel safe in saying that with 10 good men who had learned the job I could accomplish in three days what it took me one week to do with an inexperienced party of 150.

I recall the resourcefulness of one chief petty officer on patrol. His despair at untrained help for what had proved to be the rather specialized job of garbage disposition illustrates my point. His squad of 10 not unwilling seamen seemed to be unable to enter into sanitary work with the soulful enthusiasm refuse cans and rotten melon rind should inspire. Which was to be expected.

Seeing this and, I believe, sympathizing with those under him, the C. P. O. visited all shop and house owners in the neighborhood to which he had been detailed.

"If I pay half will you hire a man to clean up every day around your place?" he inquired.

Of course each one agreed, without knowledge of the others, as was part of the plan. The petty officer then robbed the local mill of its best yard foreman, a burly negro who would have sold his soul for the five dollars a day now so easily to be made by cleaning up a handful of house grounds and shop fronts.

The C. P. O. returned to the nine neighbors with whom he had bargained. The negro testified to each that he had been paid "by dis hyeh officeh, suh" 50 cents for a day's work at cleaning. Each person coughed up another 50 cents—not dreaming that eight others were doing the same. Thus for a half a dollar a day and one competent man that wily sailor accomplished in good shape what his squad wouldn't or couldn't at any price. He crowned his success by levying the 50 cents per day upon his men in turn as price of their leisure.

This episode is but a single instance of a general difficulty. Why not a permanent police gang? The vestal might carry a small carefully instructed party fully versed in all forms of sanitary, police, patrol, and general municipal cleanliness work. For extensive areas each member of this quasi-commission could lead a corresponding squad from some other ship.

Put the police gang into the ship's bill. Make it, like the fire and rescue party, a concrete group, a strong, keen tool in the hands of the executive officer who now can only say "detail four men and a petty officer." Such an offhand unit may well be compared to a broom sent ashore and thrown up on the dock, utterly valueless until someone happens along who knows how to put it to work and has both the authority and the will to do so.

This police business does not take us away from the recreation expense question. I found that field canteens hired from one to four men at wages running as high as $5 a day for intrenching work, refuse excavations, drainage and other labor. Ice procured at fabulous prices melted with tragic rapidity for want of shelters that skilled help could easily and quickly have built. Fruit gone stale or rotten, infected other fruit when even ordinary protection could have saved it and the money it was worth. Small boat trans-

fers and ferries extorted outrageous prices for handling canteen material. And so on through so tiresome a list of losses that one sheds all patience in having to argue against such obvious extravagance.

Discussion of this subject of service co-operation invariably leads up to the question " then why not everything—clothes, coal, lumber, books, every detail of our living expenses produced by the fostering government and sold at factory cost? " Some day, no doubt, we shall have such sublimation of teamwork. But for the present no great gain is in sight along any of those lines. Textile mills shave percentage to decimals when computing their profits. Great tailoring houses give us full page Apollos in Bline-Stock garments, but they make those garments by the million and use the profit of bulk production for such advertising.

The canteen business is a horse of a different color. The explanation of this difference lies in a psychological maxim: " Emotion makes men mad." It is only after careful forethought and figuring that one buys a new suit or a pound of butter. But let the gaiety of a picnic, the enthusiasm of a game, or the garbled variety of a Saturday night grip one's week-day equilibrium and it makes little difference whether cracker-jack costs two cents or two dollars. When the whim strikes it's " gimme two, boy, and keep the paltry change! "

No wonder men fight for trade like that—trade to mad-caps, loony spendthrifts scattering their silver like so many buccaneers. Advertising is cheap at any price so long as it captures the market, for the market will pay any price the advertising demands. What does quality matter when quantity is the key to a million dollar trade? " Catch their eye and you've hooked the seam of their pocketbooks . . . ." Is it to be wondered at that our canteen bricks are gilded?

It hurts to think of buying 10 cents worth of slops for a dollar's worth of real sub-signed money. Our one chance lies the way of the home grown product—co-operation—independence. It's a get-rich-quick-Wallingford scheme on the face of it, but with a prospect big enough for every sailor in the navy to have his slice, and so real as to startle out of his cold complacency the most incorrigible Laisser-Fairist in our fleet. . . . .

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

ALTITUDE, AZIMUTH AND HOUR-ANGLE DIAGRAM

By G. W. LITTLEHALES

It may not have been generally noticed that, in connection with the treatment of the Sumner line in the edition of the *American Practical Navigator* published in 1914 by the Hydrographic Office, a formula for finding the zenith-distance is given in which the haversine is the only function employed. This formula is there stated in the form

$$\text{hav } z = \text{hav}(co\text{-}L - PD) + \{\text{hav}(co\text{-}L + PD) - \text{hav}(co\text{-}L - PD)\}\text{hav } t, \quad (1)$$

but may perhaps be made to appear in more familiar terms by employing the symbols for latitude, L, and declination, d, instead of those for co-Latitude, $co\text{-}L$, and polar distance, PD, as follows:

$$\text{hav } z = \text{hav } L \sim d + \{\text{hav}(180° - [L+d]) - \text{hav}(L \sim d)\}\text{hav } t. \quad (2)$$

It may be re-written for computing a time-sight or hour-angle, thus:

$$\text{hav } t = \frac{\text{hav } z - \text{hav}(L \sim d)}{\text{hav}(180° - [L+d]) - \text{hav}(L \sim d)} \quad (3)$$

and, by analogy, for computing the azimuth, thus:

$$\text{hav } Z = \frac{\text{hav}(90° \sim d) - \text{hav}(L - h)}{\text{hav}(180° - [L+h]) - \text{hav}(L - h)}. \quad (4)$$

The feasibility thus disclosed of framing a Nautical Astronomy in which all requirements will be subserved by a single trigonometrical table, like the table of haversines, No. 45, in the *American Practical Navigator,* invested the subject with interest from the standpoint of aerial navigation, because this formula, if successfully represented in graphical form, might provide the aerial navigator with the equivalent of a volume on Nautical Astronomy in a form simple enough to fulfill the instant needs of flight.

Writing the formula in the following symmetrical form

$$\text{hav } z - \text{hav}(co\text{-}L - PD) = \{\text{hav}(co\text{-}L + PD) - \text{hav}(co\text{-}L - PD)\}\text{hav } t \quad (5)$$

it is evident that, when the observed celestial body is on the upper branch of the meridian of the observer, that is, when t is equal to zero, the right-hand member of the equation reduces to zero since the haversine of 0° is equal to zero, and, therefore,

$$\text{hav } z - \text{hav}(co\text{-}L - PD) = 0$$

or

$$\text{hav } z = \text{hav}(co\text{-}L - PD) \quad (6)$$

which is equivalent, as it should be, to the usual statement of the formula for finding the latitude from the meridian altitude of a celestial body culminating above the elevated pole of the observer, and, moreover, when the observed celestial body is on the lower branch of the meridian of the observer, that is, when t is equal to 12^h or 180°, the right-hand member of the equation becomes $\text{hav}(co\text{-}L + PD) - \text{hav}(co\text{-}L - PD)$ since the haversine of 180° is equal to unity, and, therefore,

$$\text{hav } z - \text{hav}(co\text{-}L - PD) = \text{hav}(co\text{-}L + PD) - \text{hav}(co\text{-}L - PD)$$

or

$$\text{hav } z = \text{hav}(co\text{-}L + PD) \quad (7)$$

which is equivalent to the usual statement of the formula for finding the latitude from the meridian altitude of a celestial body culminating below the elevated pole of the observer.

Employing Cartesian rectangular co-ordinates, and letting

$$y = \text{hav } z$$
$$a = \text{hav } (L \sim d)$$
$$x = \text{hav } t$$
$$m = \frac{\text{hav}[180° - (L + d)] - \text{hav}[L \sim d]}{\text{hav } 180°}$$

equation (2) will be transformed into

$$y - a = mx$$

which is the equation to a straight line intersecting the axis of Y at a distance a above the origin and passing through the first quadrant at an angle of inclination to the axis of X whose tangent is m.

If the axes of Y and X be graduated on the same scale to represent the haversines of angles, commencing with 0° at the origin designated by the letter O in Fig. 1, and extending to 180° in each case, the line EF will be the graph of the equation $y-a=mx$, and hence of

$$\text{hav } z-\text{hav}(L\sim d)=\{\text{hav } 180^\circ-(L+d)\text{hav}(L\sim d)\}\text{hav } t.$$

The length of the ordinate to the line EF, corresponding to any given value of t on the scale, OX, of abscissae representing the

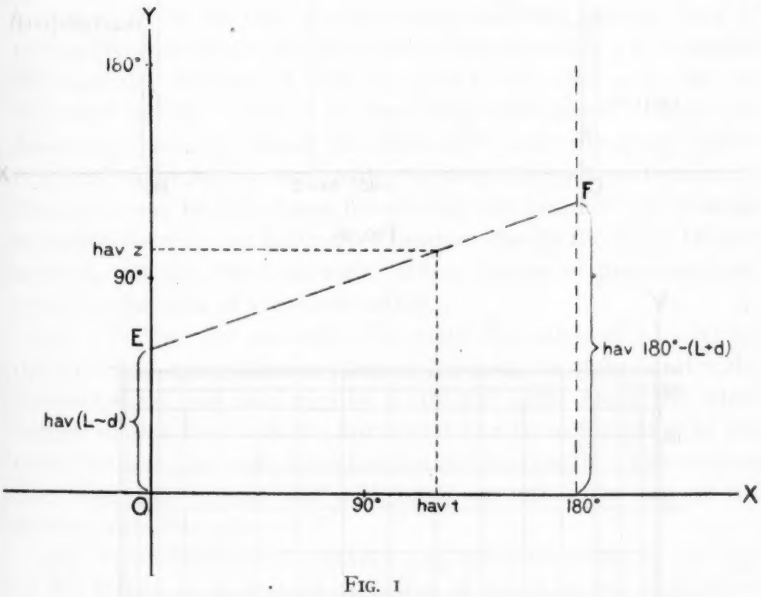


FIG. 1

values of hav t, will mark the value of z on the scale OY of ordinates representing the values of hav z; and, conversely, the abscissa corresponding to any given value of z (as when the altitude of a celestial body is measured in taking a time-sight) on the scale of ordinates, OY, will mark the value of the hour-angle, t, on the scale of abscissae, OX.

In like manner, equation (4) for finding the azimuth, Z, in which Z appears in the place of t, and the altitude, h, in place of the declination, d, may be represented by a straight line whose rectangular co-ordinates, as represented in Fig. 2, are hav Z and

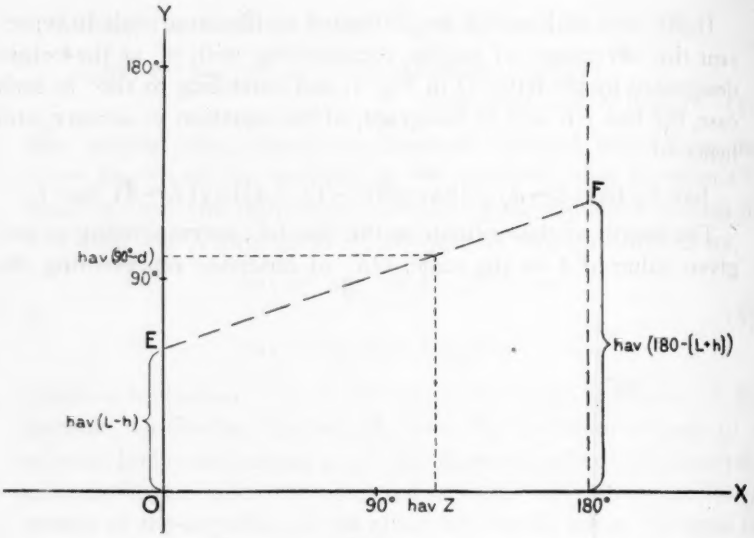

Y
180°
F
hav (90°-d)
90°
E
hav (180-(L+h))
hav (L-h)
O
90° hav Z
180°
X

FIG. 2

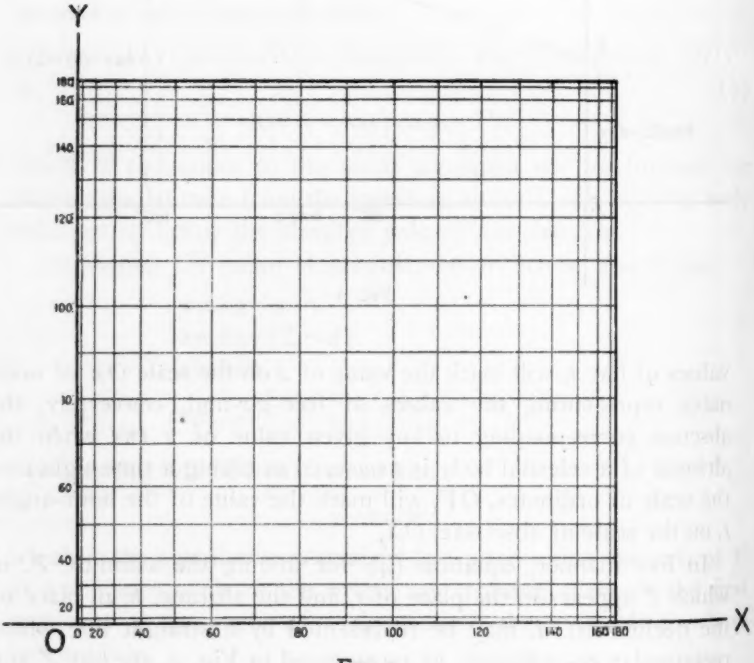

Y
180
160
140
120
100
80
60
40
20
O
0 20 40 60 80 100 120 140 160 180
X

FIG. 3

hav$(90° \sim d)$, respectively, and whose inclination to the axis of abscissae in hav Z is an angle whose tangent is equal to

$$\frac{\text{hav}[180° - (L+h)] - \text{hav}[L \sim h]}{\text{hav } 180°}.$$

The necessity for drawing co-ordinates may be obviated by extending the ordinates from the division marks of the scales of haversines constructed along the axes OX and OY and thus forming a grillage of rectangles as shown in Fig. 3.

If the right-hand border of the grillage be numbered in the reverse order from the left-hand border, that is, from 180° at the bottom to 0° at the top, the right-hand ordinate will be $L+d$ in finding the hour-angle and the zenith-distance, and $L+h$ in finding the azimuth, instead of $180° - (L+d)$ and $180° - (L+h)$ as indicated in Figs. 1 and 2 in these respective cases. Hence the following rules, by which an illustrative example given below is solved upon the accompanying finished Altitude and Azimuth Diagram, may be laid down for solving the azimuth and altitude or zenith-distance for finding the position-line by the Saint Hilaire method, and also the time-sight with a degree of precision governed by the scale of the construction.

(1) To find the azimuth (Z), mark the value of $(L-h)$ on the left-hand scale, and the value of $L+h$ on the right-hand scale. Connect these two markings by a straight line. Mark the intersection of this line with the horizontal line from the value of the polar distance $(90° \sim d)$ found on the left-hand scale. The vertical line from this intersection will mark, on either the top or the bottom scale, the value of Z.

(2) To find the zenith-distance (z), mark the value of $(L \sim d)$ on the left-hand scale, and the value of $L+d$ on the right-hand scale. Connect these two markings by a straight line. Mark the intersection of this line with the vertical line from the value of the hour-angle (t) found on the top or bottom scale. The horizontal line from this intersection will mark on the left-hand scale, the value of z.

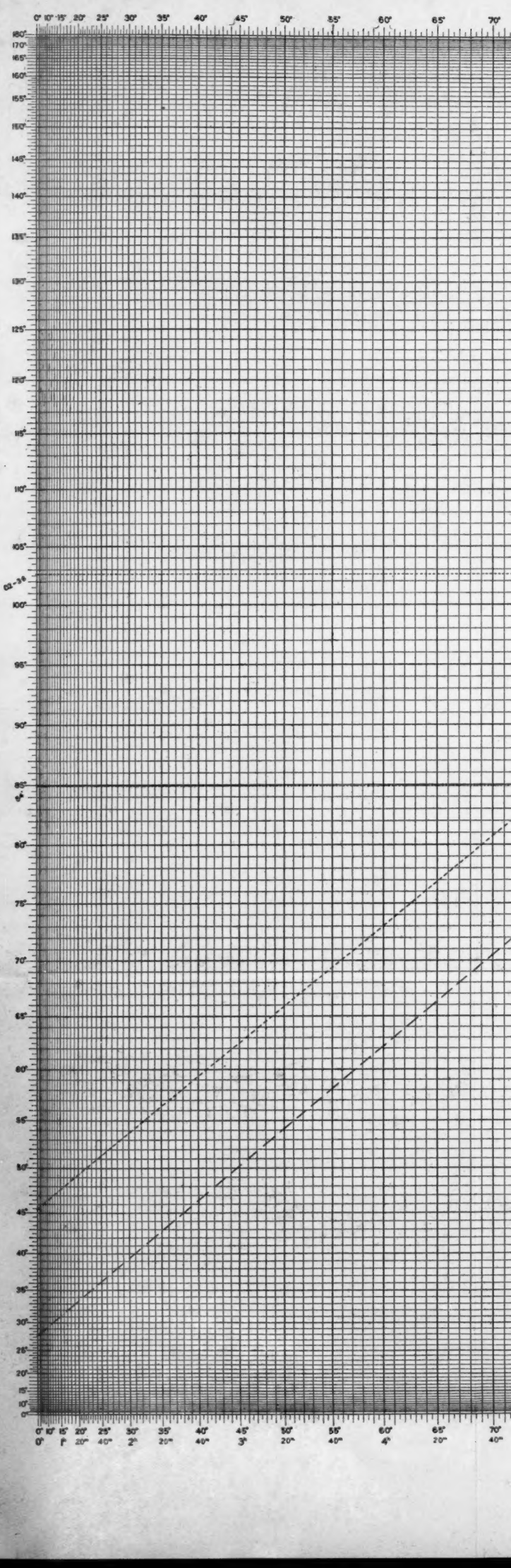
(3) When the altitude, and hence the zenith-distance, is known by measurement, by reversing the last two steps in (2), the hour-angle may be found.

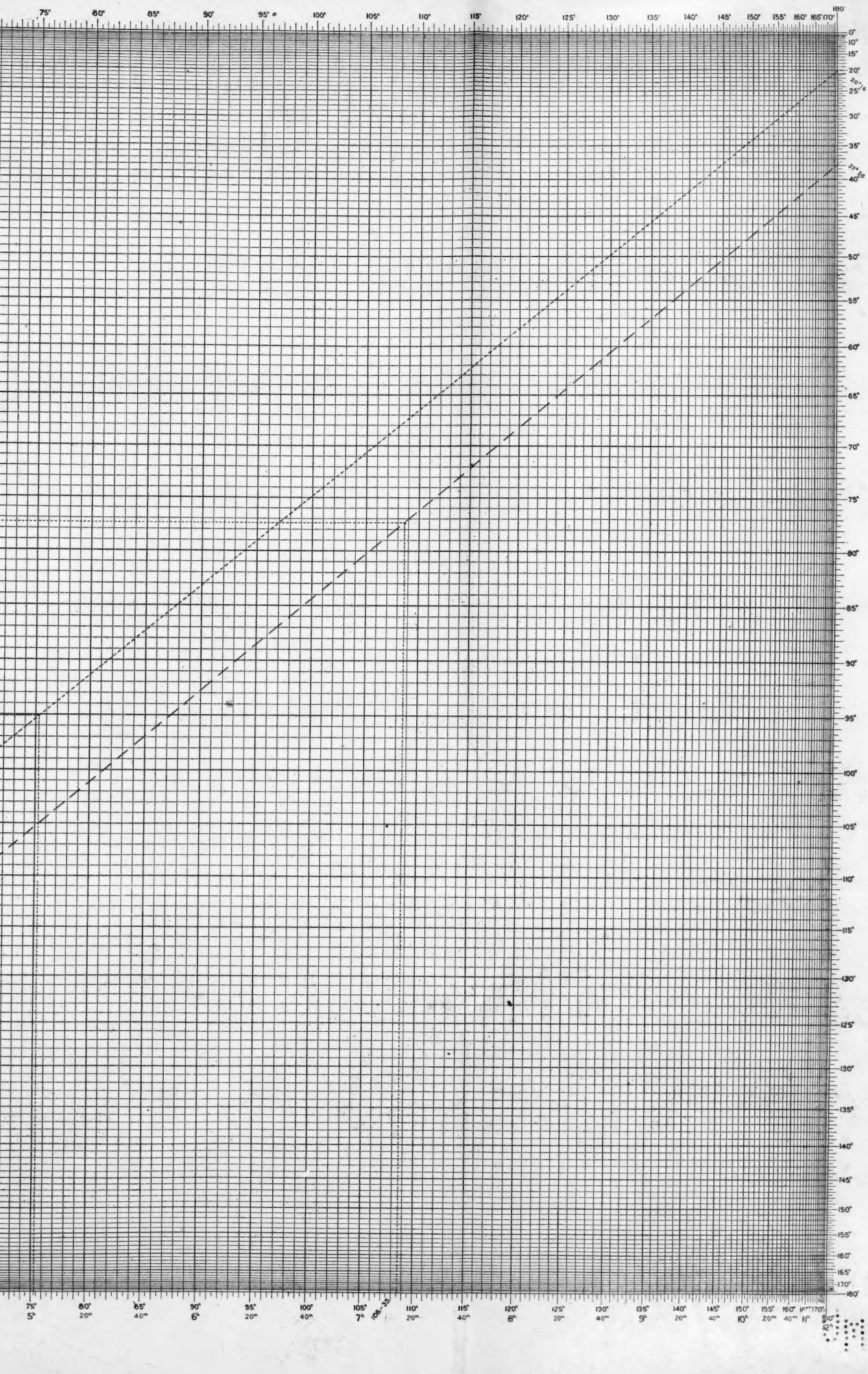
EXAMPLE

Given hour-angle, $t = 5^h\ 1^m\ 17^s$
declination, $d = -12°\ 36'$
latitude $= +32°\ 52'$
Find the altitude and azimuth.

On the accompanying grillage, by Rule 2, plotting $L \sim d = 45°\ 28'$ on the left-hand border scale and $L + d = 20°\ 16'$ on the right-hand border scale and connecting these two points by a straight line (which is represented on the diagram by short dashes but which need not be drawn in practice if a ruler is laid or a cord is stretched between the points on the border scales), the ordinate on the left-hand scale corresponding to the abscissa, $t = 5^h\ 1^m\ 17^s$ is indicated to be $84°\ 54'$, which is the zenith-distance, z. Hence the altitude, $h = 90° - z = 5°\ 6'$.

Having now found the altitude, by Rule 1, plot $L - h = 27°\ 46'$ on the left-hand scale and $L + h = 37°\ 58'$ on the right-hand scale, and connect these points by a straight line (which is represented on the diagram by long dashes). The abscissa on the top or the bottom scale corresponding to the ordinate, $PD = 90° \sim d = 102°\ 36'$ on the left-hand scale, is indicated to be $108°\ 35'$, which is the azimuth counted from the North.





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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

AN INSTANTANEOUS DEAD RECKONER

By LIEUTENANT ALFRED G. ZIMERMANN, U. S. Navy

The object of this contrivance, which may be termed a circular traverse table, is (a) to furnish a ready means of obtaining "distance run" when going at various speeds for odd minutes of an hour (such as between sights or bearings) and (b) to obtain quickly "latitude and longitude in," after steering zig-zag courses (such as occur during a war problem or during maneuvering).

To anyone who will notice the construction of this device and take advantage of the numerous possibilites which a knack in handling the instrument will develop, to him will it be a time and labor saver and an exact servant. He who expects to push a button and have the answer come without any intelligent effort on his part, will find it a source of annoyance and an unnecessary addition to his equipment. This much is claimed for the device: it presents the equivalent of the 90 closely printed pages of traverse tables in a convenient form, with no loss of exactitude and with a gain in every other direction, including the presentation of the functions of the sailing triangle in a lucid way.

The drawing accompanying this article is incomplete and serves only the purpose of illustrating the idea. It is home-made and no more exact than such things usually are; but an interpolation table has been added in each corner (which is unnecessary in the finished product) to aid anyone who wishes to try it out. The complete device consists of 47 concentric circles (only 12 are shown in drawing) properly divided, and a transparent radius arm, fastened and pivoted at the centers, bearing (a) explanatory labels and (b) a line from the outer to the inner circle which, if continued, would pass through the center of the circles. All readings are taken from this line.

The first two circles are divided and labeled like the face of a clock. The next, for convenience, is divided into hundredths. It can be called the distance circle and its divisions can represent anything in the way of distance—miles, half miles, hundredths or tenths of miles.

EXAMPLE—*Given Speed and Time. To Get Distance Run.*

(a) Ship goes at speed of 12½ knots for 1 hour 24 minutes. What was run?

When the speed is an integral part of 100 the operation is simply this:

Let 1 mile equal 8 divisions on distance circle (thus making once around the clock equal 12½ miles).

Move arm like minute hand of a clock to 24 minutes. Circle reads 40, which stands for 5 miles.

Therefore

Answer is 17½ miles.

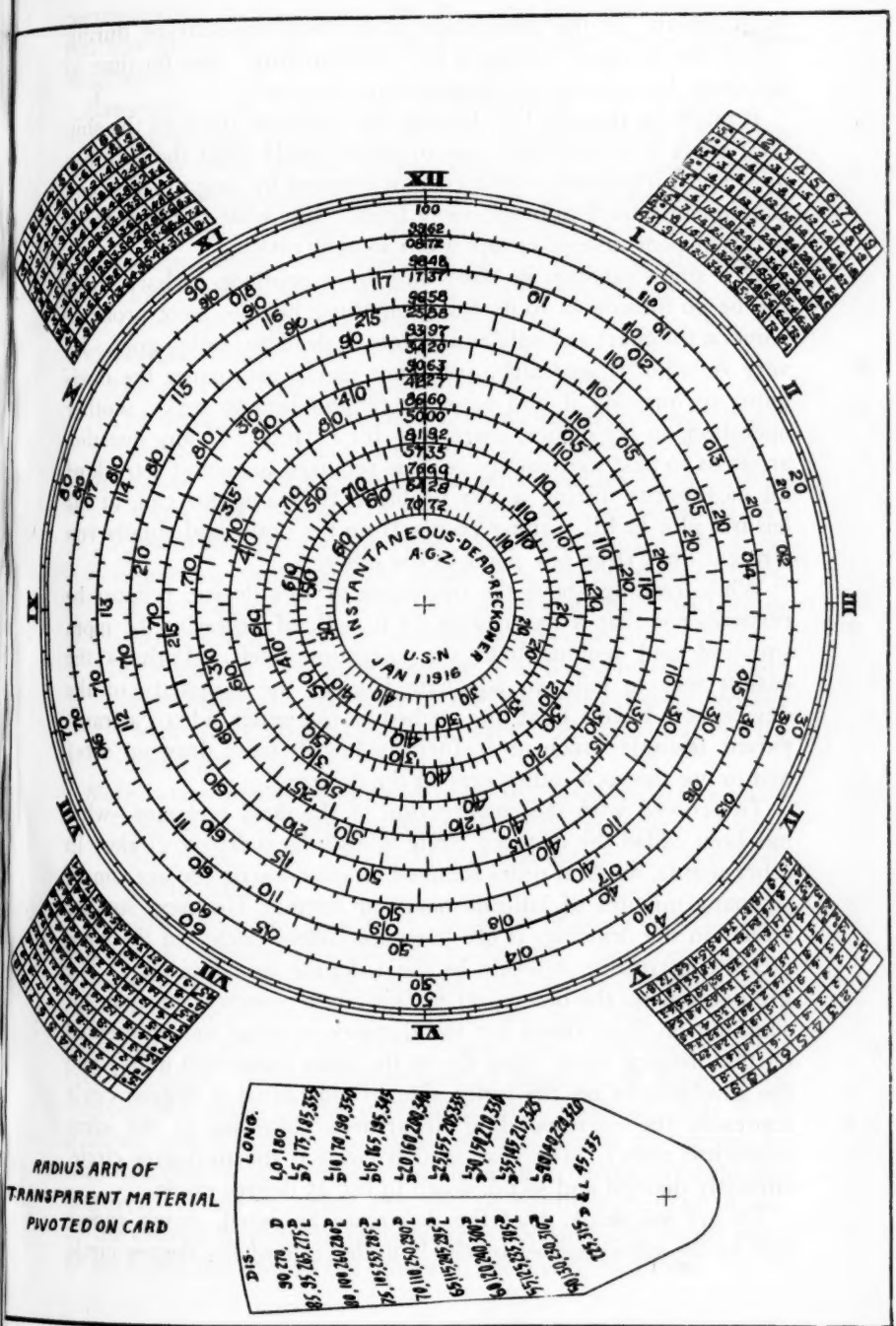
(b) Ship goes at speed 13½ knots for 2 hours 12 minutes. What was run?

Of course the complete hours require little mental attention, for it is the fractional part of an hour that always gives trouble. In case there is no convenient way of arranging the speed to exactly fit the circle, let each division equal hundredths of a mile, read your circle accordingly, apply it to the speed and the answer is there.

In this case, swing arm to 12 minutes. It reads 2 tenths. This times speed gives 2.7 which applied to the two whole hours gives 29.7 miles.

It may be well said that in the two cases above, a few scratches with a pencil, together with mental arithmetic, will bring the same answer; but it should be borne in mind that *all* combinations can be worked accurately as easily by the card and it is a good plan to work easy problems in this way so as to be able to work the awkward ones with equal facility. It is safe to say that the swinging arm will be ahead of the pencil in point of time, anyway—and who does not catch himself making a mistake in multiplication now and then?

All this is aside from the main mission of this card and is simply inserted for anyone who cares to use it. The device was constructed principally to obtain quick readings of "latitude and


INSTANTANEOUS·DEAD·RECKONER
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JAN 1 1916
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TRANSPARENT MATERIAL
PIVOTED ON CARD
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longitude in," at the completion of extensive maneuvers, during which the navigator engaged in "shiphandling" has no time to lay down his courses and distances on the chart.

It might be thought that tracing the supposed track of the ship on a chart is an excellent way to show visibly what the ship has done and furthermore it is a custom honored by long practice and consequently hard to break away from. But what virtue is there in this ancient custom, except when actually piloting?

If a ship's position be fixed only by a point on a chart, there can be no illusion as to its being anything but the most probable point on the chart and only as accurate as dead reckoning goes. Its very isolation from nearby reference marks may cause the navigator to question it and serve to remind him to make another operation on his device, correcting for current. If any question arises as to past movements, or, it is required to submit a track of all movements during a war problem, the navigator can, at his leisure, plot in his turning points from his notes and simply run straight lines from one point to the other.

While reading about the operation of this device, it must be remembered that a description of it will, of necessity, be more involved and tedious than the operation itself. Perhaps the easiest way to gain an adequate idea of the simplicity of the device, is to have a light line scribed on the under side of a transparent triangle (such as is furnished with most drawing sets) and to use this as a radius arm on the drawing.

To proceed with the construction of the dead reckoner—what has been called the distance circle is also the 0 degree circle. In other words, nautical miles steamed on course 0 or 180 are simply so many minutes of latitude north or south. The next smaller circle, on the drawing, is the 5 degree course circle (in the completed contrivance, it would be the 1 degree course circle). The graduations on the outer part of this circle represent northing or southing on that course for the distance steamed as represented on the distance circle (and are in the same numerical units) and the graduations on the inner side of this same 5 degree circle represent the corresponding departures (likewise in the same numerical units). The next smaller circle is the 10 degree circle, similarly divided and so on, down to the 45 degree circle.

To get longitude, read the departure as noted, swing radius arm to the same number on the latitude scale of the degree circle

corresponding to the latitude the ship is in (or middle latitude if run was great) and the reading on the distance circle gives the longitude.

Example.—Take a short run for illustration.

Took a sight for line of position and established a position point in lat. 40° 15′ N. and long. 70° 34′ W., and ship ran 10 miles on course 25° true before the second sight could be taken. Problem: Shift first position point to place of second sight. Or it might be stated thus: Get latitude and longitude of second sight, so that navigator can go ahead with his computation immediately.

Operation.—Swing arm to 10.

The 25° circle reads 9, so jot down 40° 24′ N.

The departure scale reads 4.2, so swing arm to 42 on 40° circle. The distance circle reads 55, so note 70° 28.5′ W.

Discussion.—If the beginner is not sure whether the departure was 4.2 or 4.3 he can let the scale on the distance circle represent five divisions to a mile. So, swinging the arm to 50, he reads the departure about 21.2, which, divided by 5, gives 4.24 (well clear of 4.3), and, by the way, the latitude here reads 45.3, which, divided by 5, is 9.06.

If his bump of academic research is well developed, he might even swing the arm over to 100, and learn that he actually went 9.063 miles to the northward, and 4.227 miles to the eastward.

Note.—The difference in the second and third departure readings of 0.013 is undoubtedly due to the approximate reading of the "21.2," and to the fact that the drawing is crudely constructed.

It is unnecessary to give more examples, or to show how easily and quickly "course and distance made good" and "course and distance to destination" are obtained, since now that the elements and their positions on the card are known, their relation is clear to anyone who has ever handled traverse tables. One thing further may be added. As the courses pass 45 degrees and approach 90 degrees, the name of the inner and outer scales of each circle changes, and what was the latitude scale is now the departure scale and vice versa. No time need be used to decide which to use, however, for the swinging arm will be lightly etched as shown, all the courses having the latitude scale outside being on the right of the index line and all the others on the left of that line.

In the finished product, it is intended to divide the distance circle into 500 parts; to make use of different colored inks for clearness; to have the subdivisions mechanically exact; and to have a course circle for every degree.

In the drawing, there is no difference between adjacent scales of over nine units, so evidently interpolation between degrees in the final device will be but a matter of a glance.

For those who require a higher degree of exactitude, there will be added a small table of corrections to middle latitude (used when converting departure into longitude) to obtain the precise "latitude of conversion." But this, of course, need not be used when distances involved are inside an ordinary day's run.

In closing, let me state the advantages of the instantaneous dead reckoner over the ordinary method:

It is much quicker.

It is independent of the position of the compass rose on the chart.

It is more accurate when handled properly.

It is as less liable to be handled improperly, as the number of its separate operations compare favorably with the number of the separate operations necessary in the ordinary method.

It saves labor as well as time.

It makes charts last longer and enables them to be kept cleaner.

It simplifies tracing back past performances for purposes of investigation, etc., from the notes made during maneuvers.

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THE MOON IN NAVIGATION

By COMMANDER H. G. SPARROW, U. S. Navy

Recently there have come to the writer's notice such peculiar and wrong conceptions of the value of observations of the moon for navigational purposes, held both by young officers and some of fairly mature experience, that he feels compelled to say a few words in correction of them.

In navigational work extending over a considerable period of time the writer has found the moon the most useful of all heavenly bodies—the sun excepted—for navigational purposes.

It has the great advantage of being visible in daylight in two of its four quarters and there are many times when the navigator who does not use it will be perplexed over the results of his sun line and await impatiently the slow change in azimuth which will permit him to cross two lines (with doubtful result, if there is current), when a glance at the almanac would show him that the moon is above the horizon and available for cross-sights with the sun, giving the "fix" which is the comfort of all navigators.

At night, also, the ease of taking moon sights should commend that body to the navigator, but, as two stars or planets are likely also to be available, the superior value of the moon is not then so great as in the daytime.

Moon sights used to be regarded as bugbears because of the additional altitude correction needed, but the *Line of Position Tables* now issued by the Hydrographic Office contains a table (for both upper limb and lower limb observations) that permits the entire correction to be picked out at once with as much ease as in the case of sun or star sights.

After correcting the altitude the procedure is the same as in the case of star or planet sights.

The impression seems to prevail among some officers that the moon's co-ordinates are not so accurately tabulated as those of

the other heavenly bodies. Needless to say this idea is erroneous and, given the same accuracy of observation of altitude and time, observations of the moon will produce just as accurate results as those of sun or star.

Give the moon a trial and you will soon learn its value in navigation and perhaps some day, when approaching Hatteras, you may gain several hours' peace of mind through its use that otherwise would have been hours of anxiety.

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NOTES ON SHIP HANDLING

A METHOD OF FINDING THE COURSE FROM ONE RELATIVE POSITION TO ANOTHER, KNOWING THE COURSE AND SPEED OF THE GUIDE, USING MARTIN'S MOORING BOARD

By CAPTAIN G. H. BURRAGE, U. S. Navy

PROBLEM

It is required to find the course from a position on line *AB* to another, as *A* to *B*; *A* to *C*; or, *B* to *A*; *C* to *A*, knowing speed and course of guide.

SOLUTION

The guide is represented at center of circle.

Place ruler parallel to *AB* ahead of the guide at a point equal to the speed of the guide, using an arbitrary speed scale.

A line to the point where the ruler crosses the circle representing your speed, on the same arbitrary speed scale, will give the new course, measured from the center of the circle.

If your change in position is to the right, the line to the point where the ruler crosses your speed circle to the right gives the change in course.

If your change in position is to the left, the line to the point where the ruler crosses your speed circle to the left gives the change in course.

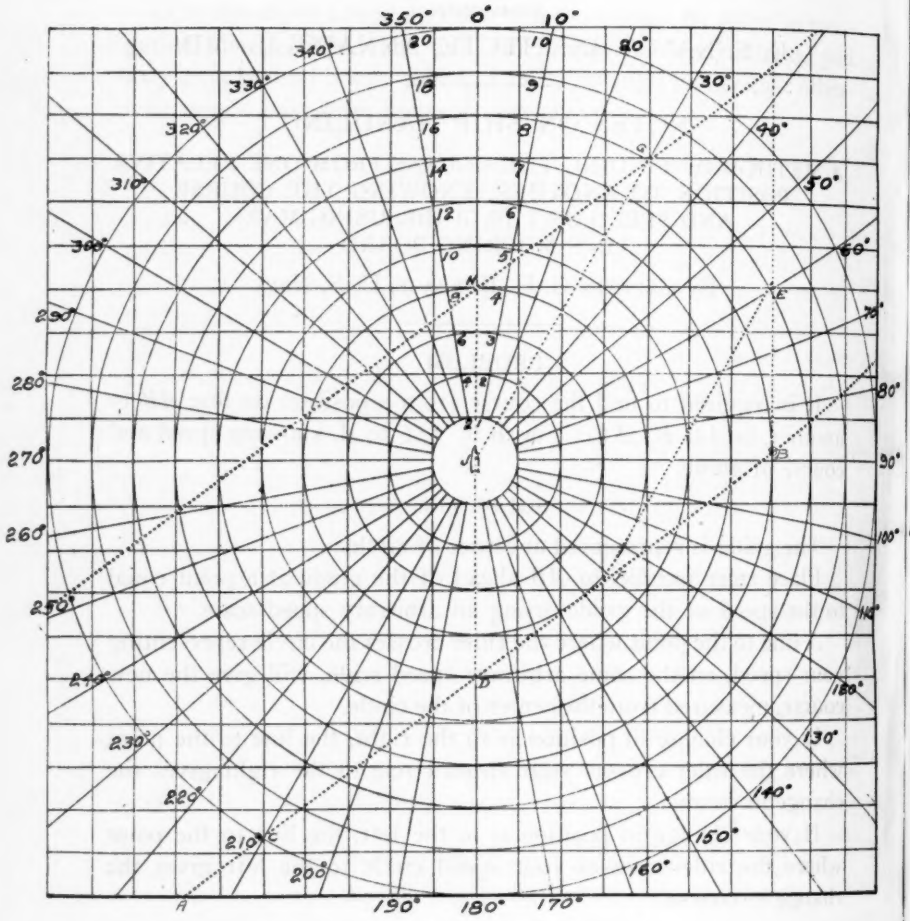
EXAMPLE (FIG. 1)

From position *D* to position *B*.

Speed of guide 8 knots, your speed 16 knots.

Place ruler parallel to *DB*, at the point *H* equal to 8 (speed of guide), ahead of *J*.

The line to the point where the ruler crosses the 16-knot circle at *G*, gives the change in course to the right, 30 degrees.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A
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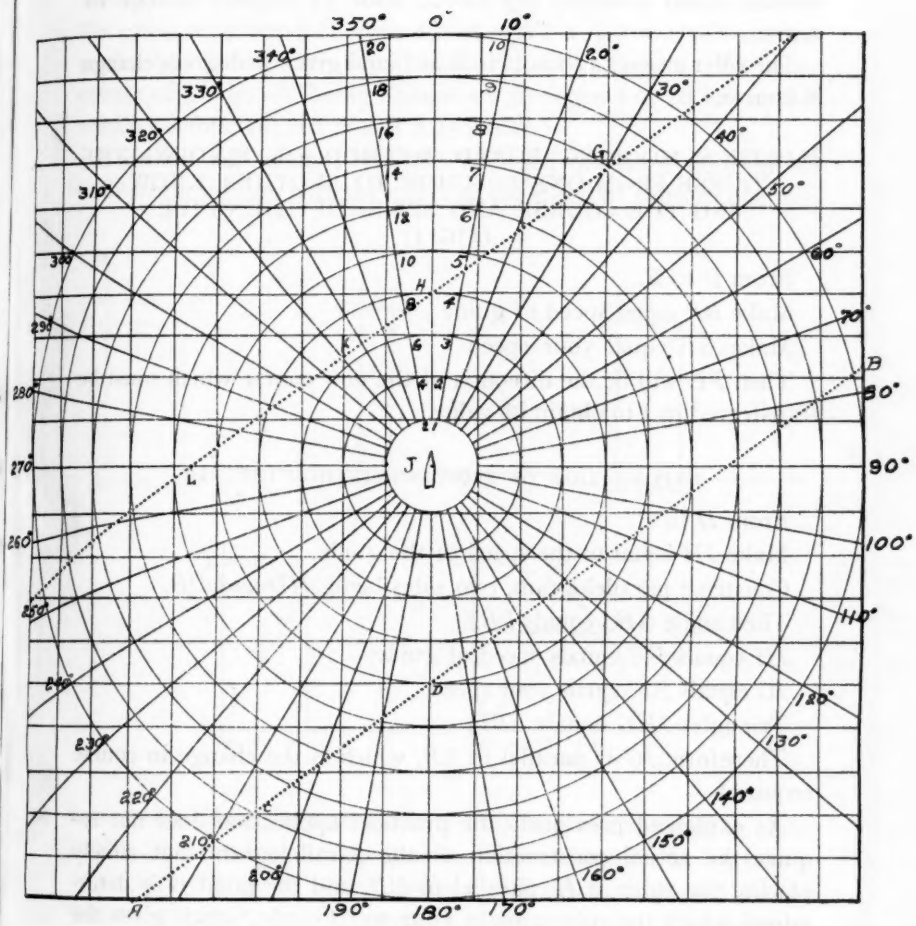
FIG. 1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140°
210°
150°
200°
160°
190°
180°
170°
A
B
D
G
H
J
K
L

FIG. 2

EXAMPLE

From *B* to *D*, speed of guide 8 knots.

The ruler is tangent to the speed circle at *K* and gives the slowest speed possible, 6.3 knots, with 35 degrees change of course.

The ruler crosses 11-knot circle at *L* and gives 90 degrees change in course.

MARTIN'S MOORING BOARD METHOD OF FINDING THE COURSE FROM ONE POSITION TO ANOTHER, KNOWING THE COURSE AND SPEED OF THE GUIDE (FIG. 1)

From *D* to *B*.

Make *BE* equal speed of guide.

Make *EF* equal your speed.

Then *FE* will be the direction of the new course which must be transferred to *J* to obtain its value.

EXPLANATION OF PROPOSED METHOD (FIG. 1)

From *D* to *B*.

Make *JH* equal to the speed of the guide.

Construct parallelogram, two sides being *HD* and *DB*.

Then angle *GHJ* equals *FBE*.

JH equals *BE* equals speed of guide.

JG equals *EF* equals your speed.

Triangles *JHG* equals *EBF*.

Therefore, *JG* is parallel to *EF*, which is the change in course required.

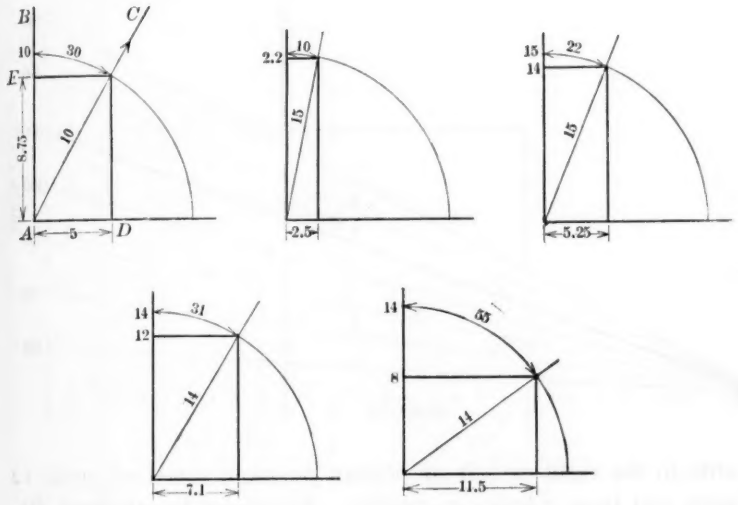
As explained previously the practical application does not require the actual construction of the parallelogram, but simply placing the ruler at *H*, parallel to *DB*, and the point *G* is determined where the ruler crosses your speed circle, which gives the change in course in degrees (Fig. 2).

The line *AB* retains its relative position to the guide at *J*, so that after changing the course to *JG* by taking the bearing and distance of the guide you can determine whether you are off the line *AB*, which may be due to variation of course, or speed of guide, or to your course and speed. A small change in course will put you back on the line and you will arrive at *B*.

ADVANCE AND TRANSFER WHILE OBLIQUING

While investigating the effect on the speed along the course of the guide of a 30-degree oblique, it was impressed on me most forcibly that the speed resolved at right angles to the course of the guide was one-half your speed. While I knew this mathematically, I failed to realize it tactically. For example: *AB* being course of guide, *AC* being oblique of 30 degrees at 10 knots, *AD* equals 5 knots and *AE* equals 8.75 knots.

This led me to construct the enclosed quadrant diagram to impress the officers with the effect on the speed of ships of changes



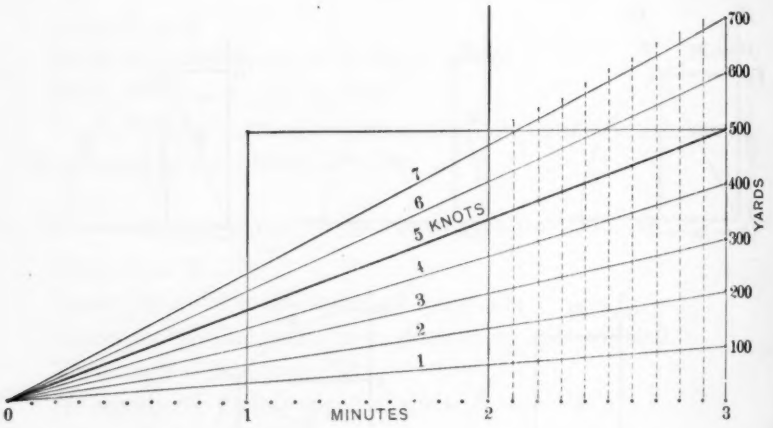
in course while in formation, as well as to give the speed at right angles to the course of the guide. For example: At 15 knots, 10 degrees change of course makes a difference of 2/10 of a knot in speed along the original course and gives a speed of 2½ knots at right angles to the original course.

Upon studying the diagram various uses were suggested. For example: The fleet steaming at 14 knots with 1 knot reserve speed, 22 degrees is the maximum change of course in which it is possible to maintain 14 knots along the course of the guide, and the speed at right angles to the course of the guide will be 5.25 knots with such change in course.

As a quick reference to know approximately the course to steer to take up a position on the beam of the guide. For example: Guide's speed, 12 knots; you have 2 knots reserve speed. Where the 14-knot circle cuts the horizontal line at 12 knots, gives 31 degrees as the change of course that will still maintain 12 knots along the course of the guide.

If guide slows to 8 knots, then 55 degrees change of course at 14 knots will give 8 knots along the course of the guide.

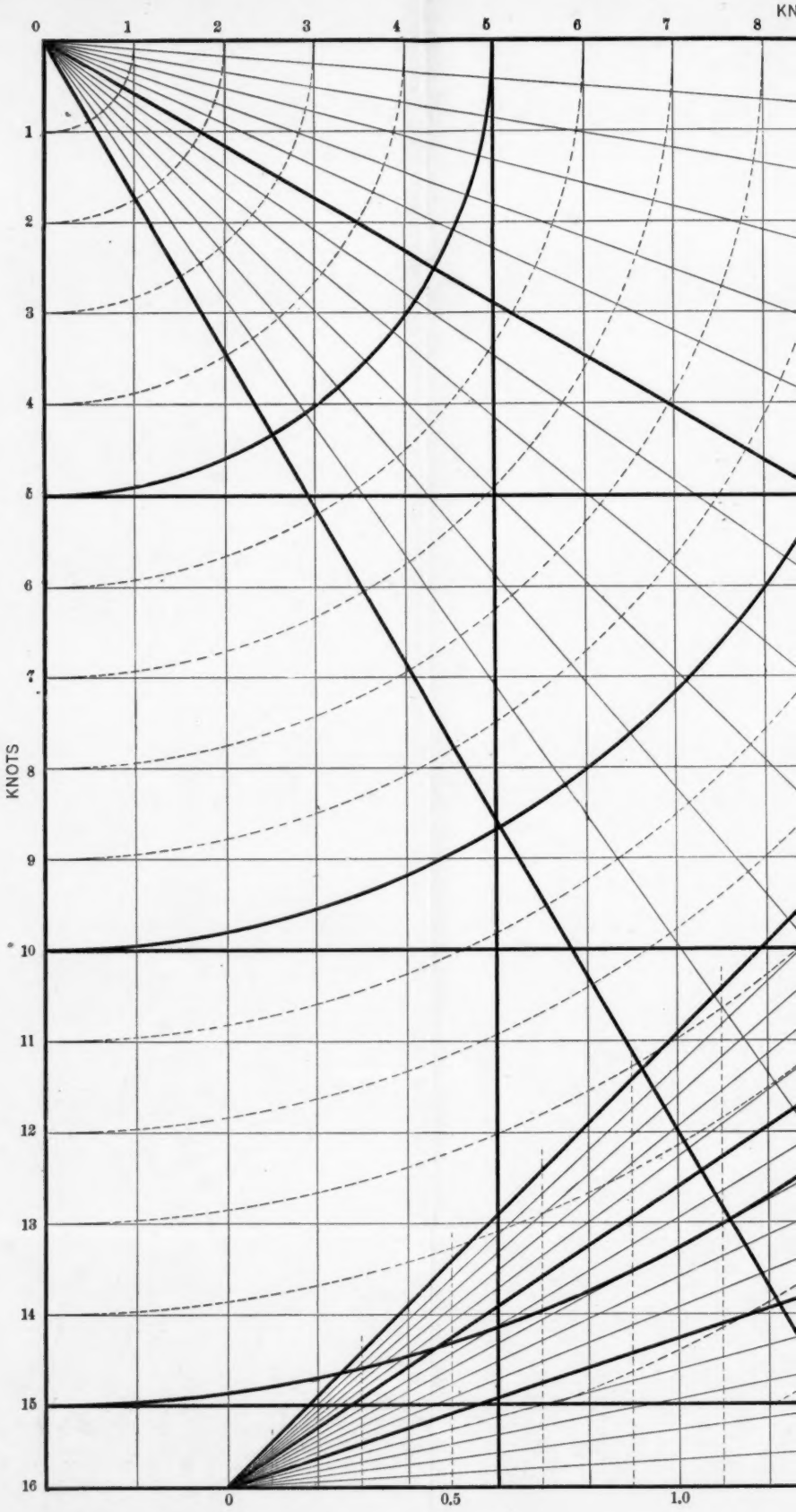
In connection with this quadrant diagram, the scale of speeds with times and distances as the elements has been found to be a ready help. For example: You wish to gain a position 1000



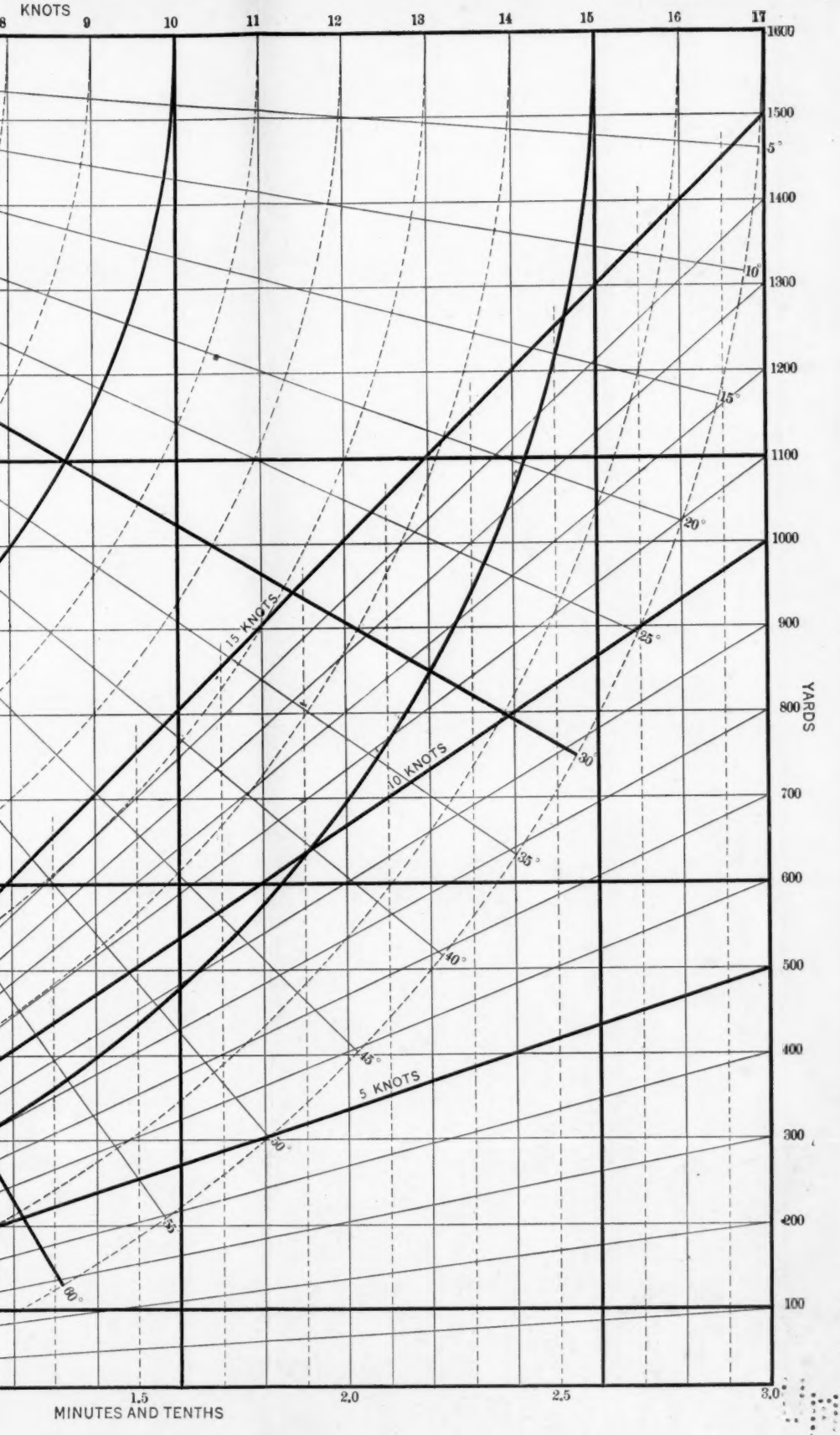
yards to the right or left of present position, speed of guide 12 knots, you have 2 knots in reserve. Reference to quadrant diagram where 14-knot circle cuts horizontal line through " 12," gives 31 degrees as the change of course that will still advance you at a speed of 12 knots along course of guide, and this gives 7 knots as the sped at right angles to the guide.

The horizontal line through " 500 " crosses the 7-knot speed line at the 2.1-minute vertical line, which shows it takes 2.1 minutes to gain 500 yards and therefore 4.2 minutes to gain 1000 yards.

The reverse of this is often required at target practice. You are 100 yards outside or inside your line. Speed 10 knots, and you desire to get back in your line in about 1 minute. The 100-yard horizontal line crosses the 1-minute vertical line on the 3-knot line, therefore 3 knots to the right or left is the change you should



Capt. G.H. Burrage, U.S.N.
U.S.S. Nebraska


KNOTS
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35°
40°
45°
50°
55°
60°
15 KNOTS
10 KNOTS
5 KNOTS
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2.5
3.0
MINUTES AND TENTHS

make. What change of course at 10 knots will give 3 knots to the right or left? The perpendicular through 3 knots crosses the 10-knot circle at 17 degrees in the quadrant diagram, which is the change of course required.

It is desirable to know that a 10-degree change in course gives 1.75 knots to the right or left, and at that speed 100 yards will be covered in 1.8 minutes.

These diagrams are useful to find quickly the course to increase or decrease the scouting intervals, and the time to reach the new positions.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

COURSE IN MARINE ENGINEERING FOR RESERVE OFFICERS

By COMMANDER G. J. MEYERS, U. S. Navy

The Department of Marine Engineering and Naval Construction at the United States Naval Academy undertook the task of establishing a summer course in marine engineering for the reserve officers undergoing a 10 weeks' period of intensive training to better qualify them for the performance of engineering duty afloat.

The class of reserve officers undergoing instruction was selected by the commandants of naval districts from the officers of the reserve force. In accordance with orders from the Navy Department, 200 of these reserve officers were ordered to the Naval Academy for a 10 weeks' course. From among this number, those whose previous education and experience had been along general engineering lines were selected for the engineering course, consisting of marine engineering and electrical engineering. In addition, practical work in gunnery and seamanship was included, with periods for military drill and gymnasium exercises.

Due to the exigencies of the service, there was no vessel of the regular navy available for use for practical instruction.

The course was proceeded with upon the following premises:

(a) That the reserve officers when starting the course should be as well, if not a little better, grounded in elementary engineering as a midshipman upon completion of three years at the Naval Academy.

(b) That practical instruction should supplement the theoretical studies to the limit of the capacity of the model room and engineering plant in the Department of Marine Engineering and Naval Construction.

(c) That the course should cover naval practice pertaining to the subjects of boilers, engines, internal combustion engines and turbines, with practical instruction only in naval construction.

(d) That the aim of the course would be to turn out officers who would be in the same status as ensigns upon graduation from the Naval Academy, in order that the engineering instruction could proceed aboard ship in the same manner as now provided for ensigns just graduated from the Naval Academy.

(e) That instruction should be given to meet the individual abilities of the students, and to enable the instructors to obtain a gauge of the character and capabilities of each student. The sections, therefore, should not contain more than eight students, and about half of the time devoted to a recitation should be given up to answering questions and to explaining thoroughly all important points in the lesson. The book work should be supplemented by the use of models in the model room.

There were assigned to this instruction 12 hours a week which were divided into four recitation periods of two hours each and two periods of two hours each for practical instruction. This made a total of 40 lessons and 20 practical instruction periods.

LESSONS

The following list of lessons was made up and adhered to. These lessons may readily be expanded by giving one lesson for two or three days, if the time allowed for the course is greater than 80 hours.

BOILERS

Text Book: Marine and Naval Boilers (1915), Lyon and Hinds.

Lesson:

1. Chapters I and II. Include Plate I. Omit pp. 18, 19, 20 and 21.
2. Chapter III. From p. 42 to bottom of p. 61. Plates III, IIIa and IIIb.
3. From "The White-Forster Boiler," p. 65, to bottom of p. 93. Plates IX, X, XI and XII. Omit Plate VIII.
4. From "Steam Gauges," p. 94, to "The Schutte-Koerting Film Heater," p. 122.
5. From "The Schutte-Koerting Film Heater," p. 122, to bottom of p. 155.

6. From top of p. 156 to bottom of p. 169. Read Chapters IX and X. Omit Table, p. 227, and Plate XVIII.
7. Chapter XI.
8. Chapter XII.
9. Read Instructions for Care and Operation of Fuel-Oil Burning Installations; and Instructions for Care and Preservation of Boilers.

ENGINES

Text Book: Naval Reciprocating Engines and Auxiliary Machinery (1914), Barton and Stickney.

Lesson:

10. Chapter I.
11. Chapter IV to "The Zeuner Valve Diagram," p. 59. From "The Double Ported Flat Slide Valve," p. 81, to end of Chapter IV.
    Chapter V. Omit from "To Show the Effects of Linking In," p. 96, to "Point of Suspension," p. 98.
12. Chapter VI.
13. Chapter VII.
14. Chapter VIII.
15. Chapter IX to Dual Air Pump, p. 191.
    From "A Pump of the Valveless Bucket Type," p. 193, to BiTherm Air Pump System," p. 193.
    From "The Circulating Pump," p. 201, to end of Chapter IX.
16. Chapter XII.
17. Chapter XIV to "Electric Steering Gear," p. 367. Read:
    Instructions for the Care and Operation of Pumps.
    Instructions for the Care and Operation of Evaporating Plants.
18. From "Electric Steering Gear," p. 367, to end of Chapter XIV. Read Instructions for the Care and Operation of Ice Machines.

READING

Text Books:

U. S. Naval Instructions.

Pamphlets issued by Bureau of Steam Engineering.

Lesson:

19. I Chapter 25.
    I Chapter 27.

20. Pamphlet: Engineering Instructions, 1917.
    I Chapter 29.
21. I Chapter 37.
    I Chapter 38.
22. I Chapter 40, Section 3.
    Pamphlet: Important Information for all Industrial Managers and Supply, Engineer and Electrical Officers.
    Pamphlet: Lubricating Oils and Cooling Oils for Internal Combustion Engines of all Kinds

INTERNAL COMBUSTION ENGINES

Text Books:
Internal Combustion Engine Manual, Sterling.
110-Foot U. S. Submarine Chasers.
Instruction Book, Navy Type Gasolene Engines.

Lesson:

23. Chapters II, III and IV, Sterling.
24. Chapters V, VI and VII.
25. Chapter VIII.
    Chapter IX, from "To Start and Stop a Motor," p. 83, to end of Chapter IX.
26. Chapter X, from "The Standard Engine," p. 101, to end of Chapter X.
27. Chapter XI, from p. 118 to "Cooling and Lubrication," p. 131.
28. Chapter XI, from "Cooling and Lubrication," p. 131, to end of Chapter XI.
29. *Instruction Book, Navy Type Gasolene Engines.* Figs. 1 and 2, p. 13, to bottom p. 16.
    From "Description of Reverse Gear," p. 19, and Figs. 4 and 5, to bottom p. 20.
    "Notes on Lubrication," p. 24.
    From "Starting the Engine," p. 45, to bottom p. 49.
30. *100-Foot U. S. Submarine Chasers.* From p. 9 to bottom p. 53.
31. From "Ignition," p. 55, to bottom p. 100.
32. From "Inspection Hourly," p. 101, to bottom p. 155.

NOTE.—In connection with Lessons 30, 31 and 32, see Plans of Submarine Chasers posted in the drawing room; also see "Specifications, Conditions of Delivery, Payment, etc., Machinery Plant, Submarine Chasers."

TURBINES

Text Book: Steam Turbines (1916), Meyers.

Lesson:

33. Chapter I.
Chapter IV. From "Introduction," p. 15, to "Steam Expansion," p. 18.
Chapter V. Omit from "The Velocity Diagram Represents," etc., p. 24, to "Pressure Staging Impulse," p. 26.
Omit from "With the Simple Impulse Turbine," etc., p. 31, to "Reaction Compounding," p. 34.
Omit pp. 36, 37 and to "Principles Used in Marine Turbines," p. 38.
Omit p. 39.
34. Read Chapter VI.
Chapter VII.
35. Chapter VIII.
36. Chapter IX.
37. Chapters X, XI and XII.
38. Chapter XIII.
39. Chapter XIV.
Chapter XV.
40. Read Chapters XVI and XVII.

The following is the list of subjects and the schedule of practical instruction covering 20 periods:

SUBJECTS

A. BOILERS: Fittings, pumps, traps, valves, expellers (model room and shop).
B. STEAM LAUNCH MACHINERY: Auxiliaries, torpedo-boat engine, 2d day in steam launch.
C. GAS ENGINES: 2d day in motor launch.
D. EXPERIMENTAL ENGINE: Operation, indicating, taking leads.
E. TURBINES: Operation, shaft calibration.
F. ANCHOR GEAR, steering gear, docking, classes of vessels.
G. Evaporators, compressors, ice machines, condensers, etc.
H. Gauges, corrosion, gas analysis, propeller measurement, water testing, etc.

SCHEDULE

Instruction	A	B	C	D	E	F	G	H
No. of Period	Section Number							
1	1	2	3	4	..	..	..	..
2	1	2	3	4	..	..	..	..
3	4	1	2	3	..	..	..	..
4	4	1	2	3	..	..	..	..
5	3	4	1	2	..	..	..	..
6	3	4	1	2	..	..	..	..
7	2	3	4	1	..	..	..	..
8	2	3	4	1	..	..	..	..
9	..	..	..	..	1	2	3	4
10	..	..	..	..	1	2	3	4
11	..	..	..	..	4	1	2	3
12	..	..	..	..	4	1	2	3
13	..	..	..	..	3	4	1	2
14	..	..	..	..	3	4	1	2
15	..	..	..	..	2	3	4	1
16	..	..	..	..	2	3	4	1
17	Special. Submarine Chasers; Chance Mar. Con. Co.							
18	do. Operate Turbines in Laboratory.							
19	do. CO_2 Recorder—Power House.							
20	do. Engineering Experiment Station.							

In addition to the above practical instruction schedule, an instructor was assigned to talk informally for one-half hour each week on the following subjects:

(1) U. S. Naval Regulations and Instructions:

R. Chapter 24, Section 3.
R. Chapter 25.
R. Chapter 26.
R. Chapter 30, Section 4.
R. Chapter 39, Article 4427 (table of ratings).
I. Chapter 17, Article 1822.
I. Chapter 21, Section 4.
I. Chapter 23, Article 2509.

(2) The duties of officers and men in the Engineer Department.
(3) The organization of the Engineer Department.
(4) The duties of junior officers in Engineer Department.
(5) Repairs.
(6) The steam log.
(7) Steaming competitions.

There was no limit of time placed upon any one subject in order that the students might ask questions freely and that discussion should not necessarily be limited.

MARKING

Marking was based upon note book work and the general observation of the instructor as to the ability of the student, the attention and thoroughness given to the work, and the character of the student. Outside of note book work, marking followed generally the system of marking in use aboard ship for officers' records of fitness.

The following is the note book work assigned and it shows of course only the character of this work. The questions may be changed or the number increased but the same questions should be given to all students alike.

Make the following sketch in the note book, using the model in the model room:

(1) Make a cross-section sketch of the B. & W. boiler. Describe all parts, how secured to other parts, how access is obtained to each part.

Have the following sketch and description placed in the note book:

(2) Make a diagrammatic sketch showing the path of the steam from the forward engine room bulkhead to feed tank; and of the feed water from the feed tank to forward engine room bulkhead. Name, locate and give the function of each part that the steam (or water) passes through from the time it arrives at the bulkhead from the boilers until the time it returns to the bulkhead on its way to the boilers. Use the torpedo-boat installation in the model room.

Write the following in note book:

(3) Describe in proper sequence the steps taken in the *overhaul* of a boiler.

WRITTEN RECITATION COVERING LESSONS 13, 14, 15, 16

I

a. Of what are large marine engine cylinders composed?
b. What is *counter-bore?*
c. To what are the cylinders attached? How?
d. What is a cylinder liner? Of what material made?

II

Sketch in cross section a piston showing method of attaching to piston rod, and the arrangement of packing rings and follower.

III

a. What is a cylinder jacket?
b. What is a piston rod stuffing box?
c. What is a relief valve? Where used?
d. What is a reducing and regulator valve?

IV

Describe briefly how motion is transmitted to the shaft from the piston, naming and describing the mechanical parts.

V

a. How is the thrust of the propeller transmitted to the ship to cause the ship to overcome the resistance of the water?
b. What is a stern tube bearing? A strut bearing? A spring bearing?

VI

a. What type of condenser is used for marine purposes?
b. What is the function of this condenser aboard ship?
c. What auxiliary machinery is necessary in connection with the use of the marine condenser?
d. Give the parts through which the steam and water flow from the time it leaves the L. P. cylinder until the water arrives at the feed pump suction.

VII

What are the following aboard ship?
a. Drainage system.
b. Flooding system.

VIII

What are the following aboard ship?

a. Fire system?

b. Flushing system?

In connection with Lessons 19, 20, 21, 22, write the following in note books:

Make out a routine as required by U. S. Naval Regulations and Instructions for overhaul, inspection and upkeep of the machinery plant, tabulating the items under the following headings:

1. Daily.
2. Weekly.
3. Monthly.
4. Quarterly.
5. General.

WRITTEN LESSON COVERING LESSONS 23, 24, 25, 26, 27, 28

I

What are the four essential systems to every internal combustion engine?

II

Make sketches showing the periods in the four-stroke cycle I. C. E. (Indicate conditions on the sketches; no separate description necessary.)

III

Sketch a Schebler carburetor. (Cross section; and name on the sketch the parts, so that the instructor may understand the operation.)

IV

Make sketches showing the periods in the two-stroke cycle I. C. E. (Indicate conditions on the sketches; no separate description necessary.)

V

a. What two classes of electrical ignition are there?

b. Define:

1. Timer.
2. Magneto.
3. Buzzer.
4. Booster.

VI

Name the six methods used in governing the I. C. E.

VII

Name 12 common I. C. E. defects.

VIII

Sketch and describe the valve group for the Diesel engine. (Questions I to VII each count 4.0; question VIII counts 12.0; total 40.0 divided by ten.)

WRITTEN RECITATION COVERING LESSONS 29, 30, 31, 32

I

Make sketches in cross section of the navy type gasolene engine and describe its operation.

II

Make a sketch in cross section of the Standard vaporizer. Name on the sketch the different parts.

III

Describe with sketches the Standard ignition system.

IV

a. Describe how to " set ignition " on the Standard engine.
b. Describe how to " time ignition " on the Standard engine.

V

a. Briefly describe the Standard engine, including control, as built for submarine chaser.
b. Briefly describe the machinery installation of a submarine chaser.

WRITTEN RECITATION COVERING LESSONS 33, 34, 35, 36

I

a. Describe (by using an example) what is meant by " critical fall."
b. Explain the necessity for the use of nozzles in steam turbines and how the necessity is met.

II

Explain by use of sketch what is meant by pressure velocity compounding in the impulse turbine, using curves to show pressures and velocities as the steam flows through the turbine.

III

Explain by sketch what is meant by reaction compounding, using curves to show pressures and velocities as the steam flows through the turbine.

IV and V

Sketch in longitudinal half cross section one of the Parsons or Curtis turbines illustrated on the plates in the book. Name on the sketch the different parts of the turbine. Name on the *sketch the turbine chosen for this question.*

WRITTEN RECITATION COVERING LESSONS 37, 38, 39, 40

I

a. 1. What is a combined or mixed turbine?
   2. Why is it necessary to use some form of reduction gear between the turbine and the propeller?
b. Name and describe briefly the four different systems of transmission between turbine and propellers, as now used in marine practice.

II

Sketch (diagrammatically) in plan view the following installations:
1. Battleship—Curtis turbines.
2. Destroyer—Curtis turbines.

III

Sketch (diagrammatically) in plan view the following installations:
1. Battleship—Parsons turbines.
2. Destroyer—Parsons turbines.

IV

a. Name six types of turbines used for auxiliary purposes.
b. What principle are these turbines constructed upon, and why?

V

Describe with sketch the turbine forced-lubrication system of a battleship or a destroyer.

The following were required to be pasted in the note book:

(1) Routine for getting under way.
(2) Routine for securing.
(3) Routine inspections, overhauling, etc.
(4) Sample letter requesting repairs.

The text books and other information used are herewith tabulated:

U. S. Navy Regulations and Instructions.
Marine and Naval Boilers (1915), Lyon and Hinds.
Naval Reciprocating Engines and Auxiliary Machinery (1914), Barton and Stickney.
Internal Combustion Engine Manual, Sterling.
Steam Turbines, Meyers.
Description of Navy Standard Boiler Water Testing Outfit and Instructions for Its Use.
Instructions for the Care, Preservation and Operation of Boilers (N. S. E. 48).
Instructions for the Care and Operation of Fuel-Oil-Burning Installations (N. S. E. 70).
Engineering Instructions, 1917 (N. S. E. 245).
Instructions for the Care and Operation of Evaporating Plants (N. S. E. 84).
Instructions for the Care and Operation of Pumps (N. S. E. 83).
Instructions for the Care and Operation of Ice Machines (N. S. E. 144).
Important Information for All Industrial Managers and Supply, Engineer and Electrical Officers, Concerning the Use and Purchase of Special Engineering and Steam Engineering Electrical Materials (N. S. E. 145).
Instruction Book, Navy Type Gasolene Engines.
Instructions, Care and Operation of Machinery Plant, 110-Foot U. S. Submarine Chasers Nos. 411 to 460.
Blue Prints of Hull and Machinery Installation of U. S. Submarine Chasers Nos. 411 to 460.
A set of steam log data sheets of each type used in the naval service.

Lubricating Oils and Cooling Oils for Internal Combustion Engines of All Kinds.

Directions for Official Correspondence, Dept. of English, U. S. Naval Academy (May 20, 1917).

Booklets covering plans of battleships and destroyers in the U. S. Navy.

The following additional recommendations are made:

(a) That reserve officers detailed for the course of instruction be graduates of recognized engineering schools.

(b) That the course of instruction as carried out covers too short a period of time for the proper assimilation of the subjects necessary to be taught.

(c) That the instruction period should continue after the student reports aboard ship until such time as the commanding officer recommends that the student is capable of taking a watch in the engine room.

In conclusion, it may be said of this course that it has been established to meet an emergency condition and that it can in no way be called equal to the four-year course pursued by midshipmen, as it is in no respect comparable to the Naval Academy course in engineering. It would, therefore, be a colossal mistake to assume that this course has accomplished in 10 weeks what ordinarily takes four years.

DISCUSSION

Altitude, Azimuth and Hour-Angle Diagram

(See Page 2541, Whole No. 177)

Commander E. B. Fenner, U. S. Navy.—1. From the navigational point of view the graphic method is perfectly correct and very convenient but exceedingly inaccurate on a diagram of the size shown. It requires a fair degree of accuracy in draftsmanship, particularly when z is small, to obtain results correct even to within a 30-mile limit, but such results could be obtained very rapidly.

2. My knowledge of the conditions in air craft is too limited to admit of any very valuable criticism, but it would seem to me that more space and better protection from wind and weather would be required in manipulating this diagram than in computing a position by the ordinary methods. In air craft of the Zeppelin type where plenty of space is available and a larger diagram could be used in shelter, it would seem an excellent method for rapid results of a fair degree of accuracy particularly when t, z, Z and $90 \sim d$ are not too far from a 90° value.

3. This method is superior to most graphic methods in simplicity and rapidity for the reason that it makes use of a single diagram of moderate size to cover all cases. For the same reason, however, it is inferior in accuracy.

MINUTES OF THE ANNUAL MEETING, 1917

U. S. NAVAL ACADEMY, ANNAPOLIS, MD.,
OCTOBER 12, 1917.

In accordance with Article V, Section 1, of the Constitution, two weeks notice having been given, the annual meeting was held in the Board Room of the Officers' Mess.

Captain E. W. Eberle, U. S. Navy, Vice-President of the Institute, presided and called the meeting to order at 8.40 p. m. There were 18 members present.

The minutes of the last annual meeting were read and approved.

A board of tellers, consisting of

Commander J. G. Church, U. S. Navy,
Lieut. Commander G. C. Pegram, U. S. Navy,
Lieutenant H. H. Forgus, U. S. Navy,

which had been appointed by the Vice-President 10 days previous to the meeting, reported the results of the balloting for officers of the Institute and declared the following qualified for office by sufficient votes of the membership:

President

Rear Admiral B. A. Fiske, U. S. Navy (retired).

Secretary and Treasurer

Commander J. W. Greenslade, U. S. Navy.

Board of Control

Brigadier General J. A. LeJeune, U. S. Marine Corps.
Captain L. M. Nulton, U. S. Navy.
Captain G. W. Laws, U. S. Navy.
Commander W. T. Cluverius, U. S. Navy.
Commander John Downes, U. S. Navy,
Naval Constructor J. A. Furer, U. S. Navy.

The board further reported that the votes on the proposed amendments to the Constitution submitted to the members were as follows:

Amendment No. 1, 1370 for and 19 against.
Amendment No. 2, 1382 for and 7 against.
Amendment No. 3, 1382 for and 7 against.
Amendment No. 4, 1383 for and 6 against.

The board therefore declared that all the amendments had received sufficient votes for their adoption.

The election of officers and adoption of all amendments was confirmed by the presiding officer.

The Secretary and Treasurer read his annual report as follows:

1. Though the increase in membership of the Institute during the past year has been unusual due to the expansion of the personnel of the navy, the membership list has not grown in proportion to this increase. Recently, however, commanding officers of vessels and officers in charge of training and development have forwarded replies to communications on this subject in which they evince great interest in the work of the Institute and a determination to assist in upbuilding it. Many new applications have come from these sources during the past two months so that it may be considered that the expected growth has just begun. The new large classes of midshipmen and reserve officers promise to make the new year a banner year of growth and activity.

2. The present circulation of the Institute PROCEEDINGS, as of October 1, 1917, is 4365 copies, divided as follows:

Honorary members	5
Life members	141
Regular members	2579
Associate members	729
Subscribers	692
Subscribers, enlisted men	52
Exchanges	107
Advertisers	29
Newspapers and periodicals	31
Total	4365

During the year..... 12 life,
742 regular,
225 associate members have joined.

A total of..... 979
Resignations..... 21
Deaths..... 35
— 56

showing a net increase of..923 members. Subscribers have increased about 33 per cent.

During the year editions of the PROCEEDINGS have been as follows: November-December, 1916, 3650; January to July, 1917, inclusive, 4200; since July, 4500 copies.

3. The PROCEEDINGS have been published in monthly form since January of the present year; it is believed that the monthly form has justified itself and no change is recommended, though the future may develop a need for the publication of special technical supplements, financial conditions permitting. The cost of producing and distributing the PROCEEDINGS in its present form, based on the first 10 issues, will be $18,600 for the year 1917—$1550 per number. The revenue of the Institute attributable to PROCEEDINGS, including dues and subscriptions, sales of PROCEEDINGS, advertising, and interest on life membership fees, will total $10,400, which leaves a total loss of $8200 on the PROCEEDINGS. From this, however, may be fairly deducted interest on investments accumulated for the purpose of supporting the Institute, amounting to $2600, which will leave the net loss on PROCEEDINGS as $5600 for the present year. This loss does not include its share of the expense of carrying on the Institute and book publication department, which cannot be accurately divided and assigned to any department.

4. The cost of printing and issuing the PROCEEDINGS per year has risen to about $2175 for each additional thousand subsequent to the first thousand. This means that with dues of $2.00 per year the net loss per thousand of new members, without regard to increased office and other charges, will be $175 per year. I, therefore, recommend that the question of increasing the membership dues to $2.50 or $3.00, and, if necessary, the life membership fee to $40.00 be seriously taken up. The point involved is whether the Institute PROCEEDINGS should be made self-supporting or nearly so, or whether the book publishing department should always be called upon to support the PROCEEDINGS. It would seem that the ideal condition would be that in which the PROCEEDINGS would pay for itself and the book publishing department make only enough to cover the office and other overhead charges.

5. The Prize Essay for 1917 was submitted by Commander Lyman A. Cotten, U. S. Navy; the Honorable Mention Essays were by Lieutenant H. H. Frost, U. S. Navy, and Colonel Dion Williams, U. S. Marine Corps. Fourteen essays were received in competition.

The Prize Essay, subject, "Submarine Warfare," could not be published as it was considered by the Navy Department to contain data which should be held confidential.

6. Editions of the following books have been reprinted:

Bluejacket's Manual,
Landing Force,
Practical Manual of the Compass,
Manual of International Law,
Marine & Naval Boilers,
Physiology, First Aid and Naval Hygiene,
Range and Ballistic Tables,
Reciprocating Engines and Atlas,
Ship & Gun Drills,
Steam Turbines, and
Wireless Telegraphy.

These books have been corrected and reprinted:

Deck & Boat Book,
Groundwork of Naval Gunnery,
Naval Ordnance.

These have been thoroughly revised and published:

Electrician's Text Book (2 Vols.),
Mechanical Processes, Danforth,
Watch Officer's Manual.

The following are now undergoing revision or in press after revision:

Naval Construction,
Navigation and Compass Deviations,
Recruit's Handy Book,
Wireless Telegraphy,
Handy Book for Engineer Department,
Artificer's Manual, and
Landing Force.

Naval Construction has been completely revised and is now in press; Muir's Navigation and Compass Deviation has been thoroughly revised and brought up to date—the manuscript is now being checked up by the Department of Navigation at the Naval Academy; The Recruit's Handy Book has been revised and enlarged and will come from the press in the near future; contract has been completed whereby the Institute secured the copyright and publishing rights of the Watch Officer's Manual, which has been revised and enlarged by Ensign S. Endel, U. S. Navy, and the book is now on sale by the Institute; the Manual of Wireless Telegraphy is now undergoing a revision and should be ready early next year; the Handy Book for Enlisted Men of the Engineer Department is now undergoing an extensive revision prior to sup-

plying the Navy Department with a large number of copies; the Institute has secured permission to copyright and publish the Artificer's Hand Book, by Chief Carpenter McCall Pate, U. S. Navy, and is now revising the book which will be issued about the first of the new year as the Artificer's Manual; the Landing Force and Small-Arms Instruction is undergoing a thorough revision, but will not be ready for issue until after January 1 next year.

The following editions have been printed:

Bluejacket's Manual	28,000
Constitutional Law	500
Deck & Boat Book	13,000
Electrician's Text Book, Vol. I	2,500
Electrician's Text Book, Vol. II	2,700
Elements of Hydrographic Surveying	1,200
Groundwork of Naval Gunnery	1,000
Landing Force	12,300
Marine and Naval Boilers	1,000
Practical Manual of Compass	1,000
Manual of International Law	600
Mechanical Processes, Danforth	2,000
Naval Ordnance	2,000
Physiology, First Aid and Naval Hygiene	2,000
Range and Ballistic Tables	1,600
Reciprocating Engines	1,100
Reciprocating Engines Atlas	1,100
Ship & Gun Drills	4,000
Trigonometry	1,600
Turbines	1,000
Recruit's Handy Book	21,000
Navigation and Compass Deviations	1,000
Hints for Junior Officers	500
Watch Officer's Manual	3,000
Wireless Telegraphy	3,000

The editions of the following books have been exhausted and will not be reprinted:

Genius of Naval Warfare, Strategy,
Genius of Naval Warfare, Tactics,
Internal Combustion Engines, Barton,
Nautical Phraseology, and
War on the Sea.

7. Suit for infringement of copyright against the Washington Loose Leaf Company is still pending, not having been brought into court for hearing.

FINANCIAL STATEMENT

8. Receipts, 1 Oct., 1916, to 30 Sept., 1917 ..... $75,688.87
Balance, 1 Oct., 1916 ..... 17,025.24

Totals $92,714.11
Disbursements, 1 Oct., 1916, to 30 Sept., 1917 ..... 60,343.34

Balance, 1 Oct., 1917 ..... $32,370.77

CASH ASSETS

Dues	$1,307.00	
Text-books	15,921.18	
Advertisements	349.92	
		17,578.10
Totals		$49,948.87

CASH LIABILITIES

Lord Baltimore Press	$13,145.41	
Newsdealers, etc.	392.04	
Revision of Electrician's Text Book	800.00	
Royalties to authors	4,688.80	
		19,026.25
Totals		$30,922.62
Balance, 1 Oct., 1917		17,025.24
Increase over last year		$13,897.38

The following items affect this increase:

Decrease in stock on hand over 1916 ..... $5300
Increase in investments, Liberty Bond 5000

which gives a net increase in valuation of about $13,600 over 1916.

The following persons were favorably reported on by the Board of Control and duly elected life or associate members of the Institute:

LIFE MEMBERS

Mendl, Wladimir V., Naval Constructor, Roumanian Navy.
Adams, Arthur, Mr.
Hyde, Jas. Hazen, Mr.

ASSOCIATE MEMBERS

Potter, Allen, Mr.
Fitts, O. A., Mr.
Ten Eyck, John C., Mr.
Pearson, Paul P., Mr.
Newhall, Thos., Mr.
Turner, John, Dr.
Gardiner, F. N., Mr.
Rogers, John I., Mr.

Halliday, Morris S., Mr.
Hennighausen, F. H., Mr.
Russell, P. K., Mr.
Dana, Chas. B., Mr.
Hammond, Paul L., Mr.
Peters, Hugh D., Mr.
Greenough, Wm., Mr.
Murphy, Edw. J., Mr.
Ernst, Alfred A., Mr.
Kingsbery, F. J., Jr., Mr.
Anderson, Pierce, Mr.
Pond, Geo. K., Mr.
Holloway, Bert., Mr.
Lyon, Wm. L., Mr.
Smith, Harry, Mr.
Howard, F. H., Mr.
Sergison, Jas., Mr.
Ogden, Jas. Thos., Mr.
Hehre, Fred. W., Mr.
Dorr, Fred. W., Wash. N. M.
Coe, Thos. I., Mr.
Beale, Geo. B., Mr.
Outerbridge, G. W., Mr.
Hope, Herford, Mr.
Hulbert, H. S., Dr.
Woodruff, Fred. N., Mr.
Kneass, Edwards, Mr.
Kerr, Wm. B., Mr.
Christmas, John K., Mr.
Smith, F. V. L., Mr.
Frantz, S. G., Mr.
Rose, Alfred L., Mr.
Thompson, Chas. F., Mr.
Baily, Robt. W., Mr.
Adams, E. P., Prof.
Hunkin, S. E., Mr.
Dahlen, Ernest J., Mr.
Esty, Edw. S., Mr.
Emmons, Robt. W., 2d, Mr.
Kenney, Melvin P., Mr.
Cunningham, L., Mr.
Jarvis, Frank W., Mr.
Englis, John, Mr.
Eisenbrey, R. Howard, Mr.
Goetz, Norman S., Mr.
Church, Alfred W., Mr.
Powers, Fred. D., Mr.
Kingsley, Ralph H., Mr.

Ellison, Eben H., Mr.
Kirk, Frank W., Mr.
Claghorn, Clarence, Mr.
Moorman, Henry DeHaven, Mr.
Kendall, Harry S., Mr.
Pickman, Edw. N., Mr.
Russell, John McGee, Mr.
Hurlburt, W. Merritt, Mr.
Blanchard, Wells, Mr.
Dodds, John M., Mr.
Schroeder, Chas. M., Mr.
Platt, W. S., Mr.
Hill, Melville A., Mr.
Lockwood, A. F., Mr.
Brough, Robt. N., Mr.
Moore, Morgan McV., Mr.
Booth, Walter C., Mr.
Higgensen, F., Mr.
Hall, E. B., Mr.
Whitehouse, Irving, Mr.
Tyson, Geo., Mr.
Sasso, Y., I. J. N.
Robinson, Jas. Sidney, Mr.
Stuart, M. C., Mr.
Hoffman, Wm. J., Mr.
Barbour, H. H., Mr.
Wardwell, Austin K., Mr.
Jones, David P., Mr.
Weaver, Herbert B., Mr.
Booth, John H., Mr.
Potter, Chas. A., Mr.
Eberby, Wm. H., Mr.
Kumler, Preston, Mr.
Young, Nathan, Mr.
Powell, Garland W., Mr.
Powel, Sam., Mr.
Potter, Geddes B., Mr.
Sullivan, John J., Mr.
Stuart, Jos., Mr.
Putnam, R. L., Mr.
Fassett, E. G., Mr.
Ware, Albert L., Mr.
Lurye, Henry I., Mr.
Edwards, Chas., Jr., Mr.
Grover, Chester A., Mr.
Quinby, Wm. P., Mr.
Guild, S. E., Jr., Mr.
Edsall, W. S., Mr.

Ayer, Chas. F., Mr.
Schmitt, Rupert O., Mr.
Woodworth, C. C., Mr.
Fernbach, H. L., Mr.
Colhoun, C. Forbes, Mr.
McGiffin, Malcolm, Mr.
Cushing, Geo. M., Mr.
Yajima, T., I. J. N.
Matsubara, M., I. J. N.
Williams, T. Deland, Mr.
Dusinberre, G. B., Mr.
Crockett, Albert S., Mr.
Stair, Jacob, Jr., Mr.
Scheetz, Francis Harley, Mr.
Street, Chas. F., Mr.
Rudd, H. W. Dwight, Mr.
Earp, J. M., Mr.
Bigley, Curtis F., Mr.
Babcock, Courtlandt W., Mr.
Alejos, Peter A., Mr.
Trester, Leonard W., Mr.
Cooke, Stanley S., Mr.
Armstrong, E. Y., Wash. N. M.
Embree, Pierson, Mr.
Schornstheimer, Graser, Mr.
Chase, Chas. A., Mr.
Hayden, J. R., Mr.
Wright, John G., Mr.
O'Hara, Kimball, Mr.
Wheeler, Arthur, Mr.
Hope, Chester R., Mr.
Wilkins, Harold S., Mr.
Errickson, S., Mr.
Lo Russo, Angelo, Mr.
O'Connor, G. R., Mr.
Willoughby, Hugh L., Jr., Mr.
Krez, Paul T., Mr.
Demory, A. R., Mr.
Christopher, Herman R., Mr.
Richards, H. M. M., Mr.
Williams, H. Pushae, Mr.
Snow, Chas. W., Mr.
Howard, J. H. P., Sr., Mr.
Grant, Geo. F., Mr.
Robboli, Chas. E., Mr.
Thompson, W. K., Mr.
Fukunaga, K., I. J. N.
Miles, George R., Mr.
Bannon, John S., Mr.
MacDonald, Ralph F., Mr.
White, Edgar T., Mr.
Joy, Richard P., Mr.
Cole, Winthrop, Mech. Eng.
Neilson, John, Mr.
Webster, E. M., Mr.
Toyoda, Teijiro, I. J. N.
Mar, P. T., Mr.
White, Harry K., Mr.
McNeil, O. M., Mich. N. M.
Chapman, Madison D., Mr.
Centner, Wm. F., Mr.
O'Shea, E. M., Mr.
Green, J. R., Mr.
Erquiaga, Eugenio S., Mr.
Witzmann, Henry W., Mr.
Wambaugh, Miles, Mr.
Hay, M. S., Mr.
Morse, Geo. A., Mr.
Wilshire, Geo., Mr.
Dean, Lawrence J., Mr.
Howard, J. P. H., Jr., Mr.
Carrick, John J., Mr.
Snelling, Chas. M., Prof.
Jofre, Eduardo, Mr.
Shaw, John B., Mr.
Mather, John, Mr.
Chase, Alfred E., Mr.
Derby, W. M., Jr., Mr.
Frothingham, Brooks, Mr.
Archer, F. P., Dr.
Russell, Sydney R., Mr.
Gardiner, W. A., Mr.
Campbell, M. S., Mr.
Burckhardt, Karl, Mr.
Whittaker, Hugh, Mr.
Thayer, Reginald, N. Y. N. M.
Nolan, Gerald, N. Y. N. M.
Riggs, Arthur S., Mr.
Kato, Hiroharu, I. J. N.
Lamoreaux, T. B., C. A. C.
Howard, Henry, Mr.
Freese, L. J., Mr.
Clark, Sydney P., Mr.
Newhall, D. A., Mr.
Joy, Henry B., Mr.
Arnold, Jas. B., Mr.

Bohn, Robt. G., Mech. Eng.
Tavares, Eleazar, B. N.
Denton, Fred. W., Mr.
Archdale, Patrick M., R. N.
Tobin, Jas. R., Mr.
Couch, Ira J., Mr.
Stillwell, H. S., Mr.
Reed, Floyd C., N. Y. N. M.
Devlin, Frank B., N. Y. N. M.
Nasse, Anthony M., Ohio N. M.
Fuju, Kensuke, I. J. N.
Mukoda, Kinichi, I. J. N.
Brown, Chas. H., Mr.
Schubert, J. Paul, Mr.
Vishnevsky, N., I. R. N.
Stiles, Frank L., Mr.
Anderson, George, Mr.
Kenesaka, T., I. J. N.
Reed, W. W., R. N.
Bashall, Chas. John, R. N.
Kikuno, S., Mr.
Lima, Hector V., Arg. Navy.
Pond, Chas. M., Mr.
Baxter, Jas. P., 3d, Mr.
Cabral, Antonio de C., P. N.
Coo, Harold R., B. N.

The following amendments to the Constitution, submitted by members of the Board of Control with the approval of the Board of Control, were, without dissenting votes, ordered presented for the consideration of the Institute members, in accordance with the Constitution:

AMENDMENT NO. 1

Article VII, Section 4, now reads: Honorary members shall be selected from distinguished naval and military officers, and from eminent men of learning in civil life. The Secretary of the Navy shall be, *ex officio*, an honorary member. Their number shall not exceed thirty (30). Nominations for honorary members must be favorably reported by the Board of Control, and a vote equal to one-half the number of regular and life members, given by proxy or presence, shall be cast, a majority electing.

Proposed reading.—Same, except, change the last sentence to read: Nominations for honorary members must be favorably reported by the Board of Control. To be declared elected they must receive the affirmative vote of three-quarters of the members represented at regular or stated meetings, either in person or by proxy.

AMENDMENT NO. 2

Article VII, Section 8, now reads: The annual dues for regular and associate members shall be two dollars, payable upon joining the Institute and upon the first day of each succeeding January. The fee for life membership shall be thirty dollars, but if any regular or associate member has paid his dues for the year in which he wishes to be transferred to life membership, or has paid his dues for any future year or years, the amount so paid shall be deduced from the fee for life membership.

Proposed reading.—Change "two dollars" to "two dollars and fifty cents," and "thirty" to "forty."

AMENDMENT NO. 3

Article XI, Section 2, now reads: The award of the above-named prize shall be made by the Board of Control, voting by ballot and without the

knowledge of the names of the competitors and the time and manner of submitting such essays shall be determined and announced by said board.

Proposed reading.—Omit the words "and without knowledge of the names of the competitors."

It was moved, seconded and carried without dissenting vote, that it be considered the sense of the meeting that the Institute's Annual Prize and Honorable Mention Awards in the Prize Essay contest should be made to essays published in the PROCEEDINGS during the competitive year.

There being no further business for presentation, the meeting adjourned at 9.06 o'clock.

J. W. GREENSLADE,
Commander, U. S. Navy,
Secretary and Treasurer.

U. S. NAVAL INSTITUTE

SECRETARY'S NOTES

The Institute

There seems to have been some misunderstanding as to the right of temporary, reserve and other officers to become regular members of the Institute. A careful reading of the Constitution and of the paragraphs which follow will remove this misunderstanding. The eligibility of *all officers* of the navy to become *regular members* is unqualified.

Hand in hand with the teaching of the technique of the naval profession should go instruction in service ways of thinking, service habits, general naval developments, the progress and lessons of naval warfare, and the diplomatic relations which affect or are affected by the war. Officers responsible for this development and training will find that the stimulation of interest and enthusiasm will be greatly helped by membership in the Naval Institute or by subscription to the PROCEEDINGS.

The Institute presents material which is of general and educational interest to every one in the Naval Service and for that reason alone claims the active support of every officer in the service.

When it is recalled that the net proceeds of the Institute's Book Publication Department are devoted entirely to the maintenance of the quality of the PROCEEDINGS or returned to the entire service in the reduction of prices of books and manuals, it will be understood that "the advancement of professional and scientific knowledge in the Navy" still continues as the primary object of the U. S. Naval Institute. The Institute is a mutual company in which the profits are divided not only among its 3500 members and subscribers but also among the entire personnel of the Naval Service.

The PROCEEDINGS are published at a loss of over $5000 per year and with the low membership dues it is not expected that the PROCEEDINGS can ever become entirely self-supporting. A great increase of membership can, however, bring the receipts for the PROCEEDINGS to such a point that the expenses will be almost balanced, enabling still greater reductions in the selling prices of the Institute's Publications. An increase of membership means also an improvement in the quality of the PROCEEDINGS because of the wider literary field and greater quantity of material which will be placed at the disposal of the Board of Control.

The Institute claims for its own:

All officers of the Navy and Marine Corps, including those of the Coast Guard, Naval Militia, and Naval Reserve on active duty, as regular members.

All officers of other arms and branches of the U. S. Service and civilians interested in the naval service as associate members.

All enlisted men of the regular service as subscribers, the subscription being the same as dues for members.

Members are earnestly urged to lend an active hand in the expansion of the Institute by doing missionary work among the officers of vessels and stations who are not members and among the enlisted men who, though interested in the work of the Institute, are not subscribers.

Personal responses by officers interested in this matter will be greatly appreciated by the Secretary as it is practically impossible to keep in touch with individual members now that the publication of the monthly Register has been discontinued.

Amendments to the Constitution

Careful consideration by the membership is requested of the Amendments to the Constitution now being submitted for ballot and published also in the Minutes of the Annual Meeting which appear in this number of the PROCEEDINGS.

The reasons for the adoption of Amendments 1 and 2 are almost self-evident and require little explanation. In the case of Amendment 3, the underlying reason for a change is that from the editorial standpoint, the present method is a great handicap on efforts to keep the PROCEEDINGS abreast the times. The holding back of essays for submission at the end of the year; the further delay caused by the time required by the Board of Control to read all essays and make a choice; and the acceptance by the board of many essays for publication which, though they have not received awards, are excellent in theme and presentation, leave the editor with a series of essays on his hands which should have been published from six to eighteen months previously. This procedure is not only unsatisfactory from the editorial point of view, but is *extremely discouraging to authors,* who do not care to see their efforts appear in print after the subject on which they have written has, perhaps, been carefully settled, indexed, and pigeon-holed by the service.

It was the sense of the annual meeting that essays should be published when submitted and accepted, and that the prize and

honorable mention awards should be chosen by the Board of Control from all essays published during the competitive year.

Reflection will show that the only apparent argument against this amendment is not entirely valid. Knowledge of authors' names should not have effect on a Board of Control of seven members elected by the entire membership, especially in view of the fact that the entire membership will have an opportunity to read and form an opinion on the merits of the essays in competition, which is not now the case.

It is hoped that the membership will return their ballots promptly in order that a special meeting may be called and the amendments, if adopted, made effective as of January 1, 1918. This action is desirable as it is hoped to publish in the January number of the PROCEEDINGS the corrected Constitution and the new rules for the Prize Essay Contest, as well as a list of the Institute membership.

It should be borne in mind that this amendment cannot change the rules for the Prize Essay Contest, 1918. Essays in competition for the 1918 Prize should be submitted as heretofore before January 1, 1918.

Book Announcements

Attention is invited to the list of Publications for a complete list of books revised and republished within the present calendar year. Three changes of price of Institute books will also be noted: Groundwork of Naval Ordnance or Exterior Ballistics has been reduced from $6.25 to $4.50; Range and Ballistic Tables, from $3.15 to $2.75; and the price of A Practical Manual of the Compass has been increased from $1.50 to $1.75.

It is announced that the edition of The Landing Force and Small-Arm Instructions, having become exhausted, a new edition will not be published, as The Landing Force Manual, U. S. Navy, 1917, is being compiled by a board of officers. The complete Landing Force Manual will be published in December, and will be ready for distribution about January 1, 1918.

Naval Construction, Robinson, is also undergoing revision and a new edition is announced for October.

Navigation and Compass Deviations, Muir, has been revised and all problems and solutions brought to accord with the new form of the Nautical Almanac. This revision has been completed by Mr. G. W. Littlehales and will be published in November.

Suggestions Invited Comment and suggestions relative to the make-up of the PROCEEDINGS are invited from all members interested in the welfare of the Institute. It is believed that the scope of usefulness of the PROCEEDINGS to members can be increased and all members are invited to assist in this work. Should any topic, on which you think an article could well be written, occur to you, send it to the Secretary and Treasurer, together with such explanation or comment as may appear desirable in order that the intent of the suggestion may be clearly understood. The Institute is desirous of obtaining good "sea yarns" for publication. It is hoped that any one who can spin such a yarn will submit it.

Membership Since September 18, 1917, 82 regular and 3 associate members have joined the Institute.

Book Department The Institute Book Department will supply any obtainable book, of any kind, at retail price, postage prepaid. The trouble saved the purchaser through having one source of supply for all books, should be considered. The cost will not be greater and sometimes less than when obtained from dealers. Bills will be rendered upon delivery of books.

Illustrations Authors of articles submitted are urged to furnish with their manuscript any illustrations they may have in their possession for such articles. The Institute will gladly co-operate in obtaining such illustrations as may be suggested by authors.

Original photographs of objects and events which may be of interest to our readers are also desired, and members who have opportunities to obtain such photographs are requested to secure them for the Institute.

Annual Dues The annual dues for 1917 became payable on January 1, 1917. It is suggested that dues be paid in lump sums covering a period of two to five years; this method of payment has advantages for members as well as for the Institute and is practiced by a number of members, both regular and associate. Response to this notice will

save the Institute a considerable sum in stationery and postage.

In case of death or resignation, dues paid in advance, except for current year, will be returned to estate or individual.

Notice

Whole Nos. 145, 146, 147, 149, 155 and 166 of the PROCEEDINGS (March, 1913, June, 1913, September, 1913, January-February, 1914, January-February, 1915, and November-December, 1916) are exhausted; there are so many calls for single copies of these numbers that the Institute offers to pay for copies thereof returned in good condition at the rate of 25 cents per copy.

Address of Members

All members are urged to keep the Secretary and Treasurer informed of the address to which PROCEEDINGS *are to be sent, and thus insure their receipt.*

This precaution is now of particular importance as notices of changes of station are not now available for the use of the Institute's staff.

Non-receipt of Proceedings

Members and subscribers are urged to notify the Secretary and Treasurer promptly of the non-receipt of PROCEEDINGS, in order that tracers may be started. The issue is completed by the 10th of each month.

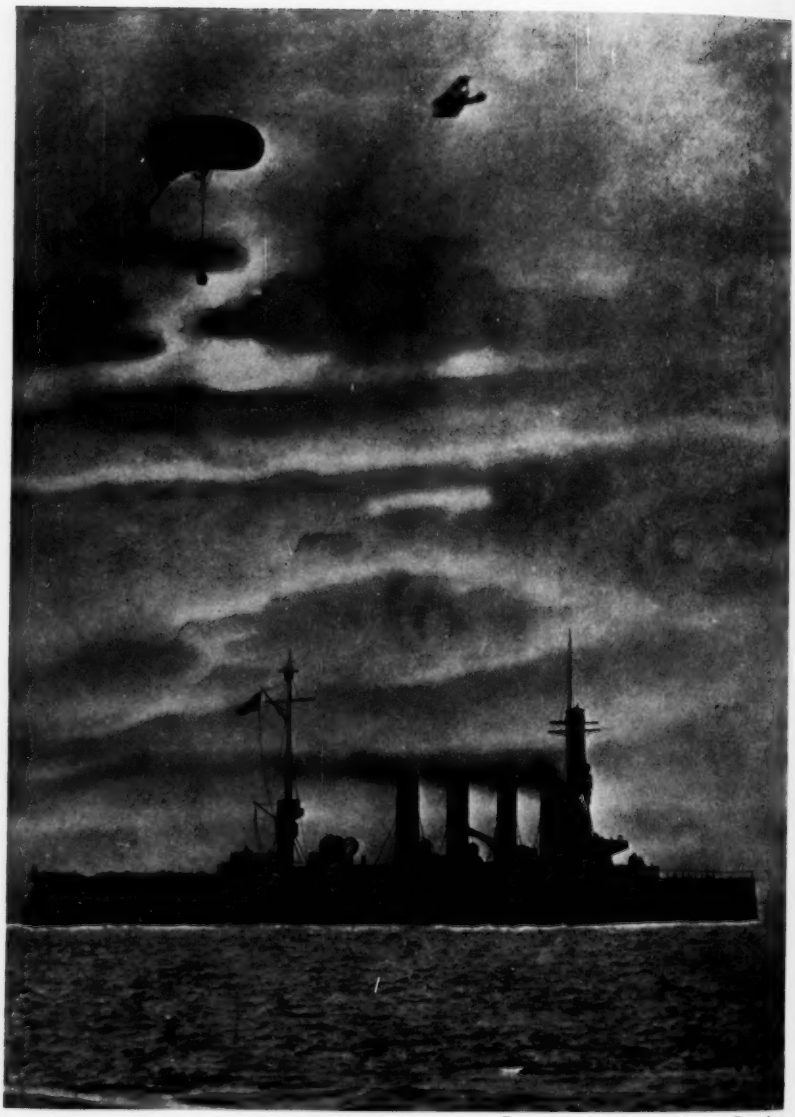
Reprints of Articles

The attention of authors of articles is called to the fact that the cost to them of reprints other than the usual number furnished, can be greatly reduced if the reprints are struck off while the article is in press. They are requested to notify the Secretary and Treasurer of the number of reprints desired when the article is submitted. Twenty copies of reprints are furnished authors free of charge.

ANNAPOLIS, MD., October 18, 1917.

INFORMATION INDEX

	PAGE
ADVERTISEMENTS, INDEX TO	I
PUBLICATIONS, U. S. NAVAL INSTITUTE	(2)
SPECIAL NOTICE	2784
PRIZE ESSAY TOPICS	2785
LIST OF PRIZE ESSAYS	2786
COMPLETE TABLE OF NAVAL LOSSES	No. 173, p. 1633



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AMERICAN SENTINELS

PROFESSIONAL NOTES

PREPARED BY

LIEUTENANT COMMANDER I. C. KIDD, U. S. Navy

GENERAL ARRANGEMENT

		PAGE
VESSELS BUILDING.	Argentina	2593
CHARACTERISTICS OF NAVAL VESSELS AND AIRCRAFT.	Cuba	2594
NAVAL POLICY.	France	2594
MATERIEL.	Germany	2596
PERSONNEL.	Great Britain	2614
OPERATIONS.	Greece	2623
	Italy	2623
	Japan	2625
	The Netherlands	2628
	Peru	2629
	Russia	2630
	Spain	2631
	United States	2631
ORDNANCE AND GUNNERY		2634
RADIO		2639
ENGINEERING		2640
MERCHANT MARINE		2645
PERSONNEL		2656
AERONAUTICS		2678
LESSONS OF THE WAR		2690
MISCELLANEOUS NOTES		2694
CURRENT NAVAL AND PROFESSIONAL PAPERS		2697

NOTE.—Ship construction in the nations at war is held confidential and no reliable information is available.

ARGENTINA

NAVY MOBILIZED.—An Associated Press dispatch dated September 24 from Buenos Aires and published in the *New York Times* September 25, said:

"Mobilization of the Argentina Navy has been ordered at a rendezvous 37 kilometers from Buenos Aires. There is also unusual military activity in the republic. Although this is ostensibly due to the general strike, a high official said that the general staff had its eyes open to 'other necessities.'

"It is learned that the general staff since the beginning of the Toro incident has had the matter of mobilization under consideration and that war plans have been completed and campaign commanders appointed. If there is a declaration of war, it is asserted, Argentina will send two divisions to Europe and will not be content with a passive attitude. The men and equipment are ready for almost immediate embarkation if the necessity arises, and the Allies in that event will be asked to furnish artillery."

GUARDS PLACED ON BOARD GERMAN VESSELS.—The following cable message from Buenos Aires was published in the *New York Herald* September 30:

"The government again has placed guards aboard German owned vessels in Buenos Aires. This action was taken late September 28. It grew out of reports which the government has received to the effect that an effort would be made by agents of the German Government to sink these vessels."

CUBA

AERO CORPS TO FIGHT IN FRANCE.—Col. Manuel Coronado, member of the Cuban Senate and editor of the newspaper *La Discusion,* has organized an aviation unit which will be offered to France, with complete equipment, in the near future. It is probable, from the enthusiasm shown by its 90-odd members, that the "Escadrille Cubaine," as the flying unit will be called, will be the first body of fighting men from Cuba to serve on French soil. Col. Coronado's original plans called for a body of 25 trained aviators to comprise the escadrille, but already nearly 100 youths, who are representative of the best families of Cuba, have volunteered to take the prescribed aviation course and individually to bear the expense of their aeroplane and equipment. Senator Coronado has just returned from New York, where he conferred with officials of the Aero Club of America and aeroplane manufacturers over the details of the escadrille's organization. Many of the volunteers for the escadrille are graduates of French universities.

"I believe that the escadrille will be the most practical and at the same time the most appropriate way of showing Cuba's sympathy with the cause of the Allies," said Col. Coronado. The colonel has asked the Navy Department in Washington for an arrangement by which the Cuban aviators may undergo their preliminary training at the navy aviation school at Pensacola, Fla.—*Flying,* October.

FRANCE

CAPTAIN GUYNEMER.—Captain Guynemer met his death in a reconnaissance flight over Flanders, having left Dunkirk September 11. His last fight is described by a comrade aviator in the *Excelsior* as follows:

"Guynemer sighted five machines of the Albatross type D-3. Without hesitating he bore down on them. At that moment enemy patrolling machines, soaring at a great height, appeared suddenly and fell upon Guynemer.

"There were 40 enemy machines in the air at this time, including Count von Richthofen and his circus division of machines, painted in diagonal blue and white stripes. Toward Guynemer's right some Belgian machines hove in sight, but it was too late.

"Guynemer must have been hit. His machine dropped gently toward the earth and I lost track of it. All that I can say is that the machine was not on fire."

Captain Guynemer was frequently asked by Daniel Vincent, then Under Secretary of Aviation, to come to the rear and place his talents as an inventor and his vast experience in war flying at the disposal of the air administration. Guynemer, however, invariably refused, being unable to give up the fascinating, adventurous life of an air fighter.

Captain Guynemer, who attained world-wide fame by his exploits, was perhaps the most brilliant aviator of the war. He was last cited in the official French announcement of September 10 for having won his 50th aerial victory. An unofficial press dispatch a few days earlier said he had accounted for 52 enemy machines. He was 21 years old.

Only a little more than two years ago Captain Guynemer was a simple soldier. He entered the French Army as a volunteer, after having been rejected five times by the medical inspectors. Joining the aviation corps,

he rose rapidly in rank until he attained the grade of captain, winning the Cross of the Legion of Honor, the Military Medal, the War Cross, and almost every other honor which his country could bestow.

The feeling of his countrymen for him was shown when the young captain, carrying the flag of the aviation group, marched in the parade in Paris at the celebration of the French national holiday last July. He was greeted with wild outbursts of cheering and was covered with flowers thrown by women and children.

Captain Guynemer first came into public notice in February of last year by bringing down his fifth enemy, thus becoming an "ace" and earning an official citation. Victories followed in rapid succession. The young aviator took part in many spectacular fights, and had the narrowest escapes on several occasions. In March of last year he was wounded.

One of the most spectacular achievements of Captain Guynemer was the shooting down of three German airplanes in two minutes and thirty seconds in September, 1916. On one occasion he was forced to descend between the French and German trenches, but was able to escape.

Guynemer operated his airplane alone, serving as both pilot and gunner.—*Flying*, October.

A dispatch from the Canadian Army Headquarters, dated September 29, follows:

"A German airman, brought down wounded and taken prisoner September 28, stated that Guynemer, the French air-fighter, was killed in battle with a German airplane. Guynemer was buried, the prisoner said, just behind the front line.

"The capture of this German airman, who wore many decorations, came as the climax to a series of dramatic air duels caused by a German effort to stop effective Canadian gunfire directed by airplanes and observation balloons.

"He darted out from a concealing haze just before sunset, firing at one of the Canadian balloons like a cowboy on a rampage shooting up a western town. The balloon caught fire, and the observer jumped and came slowly to earth, buoyed up by his parachute. A Canadian aviator went up and, outclassed though he was by the fast German single-seater, attacked the foe. He was put out of action by the German almost at once by a volley that injured the mechanism of his plane and forced him to come down.

"The German seemed for the moment to be undisputed victor in the duel, which was witnessed by thousands of men in the camp below. As he turned to make off in an easterly direction, a British fighting plane came up from the south at an incredible speed and, wheeling above the German, opened fire. The latter sought to maneuver for position, but before he could swing so that he could use his gun, his plane was riddled, and he was shot through both wrists. With splendid pluck he controlled his plane and came to earth without further injury.

The failure of this crack airman evidently dampened the ardor of the German flyers, for the balloons have been unmolested to-day.—*N. Y. Times*, 30/9.

The death of Captain Georges Guynemer, the famous French aviator, has now been definitely confirmed. Information received by the Red Cross says Guynemer was shot through the head north of Poelcapelle, on the Ypres front. His body was identified by a photograph on his pilot's license found in his pocket. The aviator was buried with military honors in the Poelcapelle cemetery.—*N. Y. Times*, 5/10.

FRENCH AIR SERVICES UNITED.—An official decree published in Paris on August 18 announces the fusion of the French Army and Navy Air Services under the single direction of the Sub-Secretary of State for Aeronautics. The latter, who is directly responsible to the French Parliament, has hitherto been only in charge of the Army Air Service, the Navy Air Service having been under orders of the Minister of Marine. The position of Sub-

Secretary of State for Aeronautics is at present filled by M. J. Dumesnil.

The decree also emphasizes that the French air services will act in close cooperation with the air services of the Allies.—*Aviation*, 15/9.

THE WORK OF THE FRENCH AIR PATROLS.—From the vivid and detailed account of the work performed by French flying patrols in the Channel which the Ministry of Marine has allowed the Exchange Telegraph Company to publish, it is easy to understand why U-boats are operating farther afield. So complete is the organization for guarding merchantmen that a busy port "resembles a well-regulated railway station." Each section of the Channel is patrolled by dirigible balloons, hydroplanes and armed watercraft working in close combination; day by day at regular hours a fleet of supply vessels leave harbor for their various destinations, convoyed before and behind by warships. Over this fleet cruise dirigibles, now on one side then on the other, in shifts of 8 to 12 hours. When a submarine or a mine is sighted the fact is communicated by wireless to the cooperating warships and to the attendant seaplanes, which act as cavalry to land forces, all of them performing their part, according to plan, in the method employed for getting rid of these murderous pests to navigation. Sometimes the dirigible drops bombs on a suspicious-looking object under water before the patrol boat arrives, and, if the observation from the sky has been correct, she, too, drops bombs on the same spot. Not that the signs which used to indicate the destruction of a U-boat are now so definite as they were, the enemy creating them to give a wrong impression. But the Channel air scouts take no chances. Anything moving under the water in bulk is promptly bombed. As for the mechanicians who are employed in this service their coolness is marvellous. They doctor ailing motors 600 feet above the Channel as expertly as if they did not have to balance on a slender rod, heaven knows how, to perform the job. Besides submarines, these air patrols wage war on mines, to destroy which they have a special armament.—*The Army and Navy Gazette*, 22/9.

GERMANY

THE MUTINY.—A mutiny among the crews of four battleships of the German fleet has occurred at Wilhelmshaven. One of these battleships was the *Westfalen*, whose captain was thrown overboard and drowned. The crews landed. Marines refused to fire on them, whereupon soldiers surrounded the sailors, who surrendered.

A mutiny is reported to have occurred on the German warship *Nurnberg*, which was at sea. The men seized the officers and proceeded in the direction of Norway, with the intention of being interned. The *Nurnberg* was overtaken by destroyers and forced to surrender.

Emperor William went to Wilhelmshaven and ordered that one out of every seven mutineers be shot. Chancellor Michaelis protested, with the result that only three were shot. Heavy sentences were imposed on the others.

Emperor William's journey to Wilhelmshaven, in company with Chancellor Michaelis, was made after the mutiny had been suppressed.

The Chancellor's objections to the Emperor's order that one mutineer in every seven be shot were on the ground that he could not assume such responsibility before the Reichstag.

One of the reasons for the mutiny was bad and inadequate food.

In a speech in the Reichstag regarding the plot discovered in the German Navy, Wilhelm Dittman, socialist member, said the punishments inflicted on men in the navy for the mutiny at Wilhelmshaven amounted collectively to 200 years' penal servitude, and that several men had been condemned to death.

The *Westfalen* is a battleship of 18,600 tons, built in 1906. The *Nurnberg* is a new vessel, and is not listed in the latest naval records to reach this

country. She is a namesake of the cruiser *Nurnberg*, of Admiral von Spee's Pacific squadron, which was sunk at the time the squadron was destroyed by the British in the battle off the Falkland Islands in December of 1914. Dispatches to London stated the *Luitpold* and the *Kaiser* were among the battleships on board which there was mutiny.—*N. Y. Herald*, 11/10.

Comments by Mr. Arthur Pollen.—The following article by Mr. Arthur Pollen appeared in the *New York Times*, October 11:

The two significant facts about the mutiny of the German fleet are, first, that the mutiny is in the fleet and not in the army, and next, that it took place six weeks ago. It was something less than six weeks ago that there occurred the turn in the tide of the submarine war. One is immediately faced with the question, What is the connection, if any, between the mutiny and the decline in the submarine successes?

To answer this question we have to go back to the spring of 1915. When the submarine war against trading ships was first proclaimed the underwater service in the German Navy was made extremely popular, first, by the promise of success and the prospect of honors and decorations to those who distinguished themselves; secondly, by a very high rate of pay offered to those who volunteered for the service; thirdly, by the promise of prize money for every ship sunk.

From February, 1915, until September of the same year, there was no lack of volunteers. But in August and September the measures taken by the British Admiralty began to be effective and the losses in German submarines were very formidable. Just how many boats were sunk has never been published. But it was a very high proportion, probably exceeding 50 per cent of those at the disposal of the Marineramt in this period, and the fact of these losses could not be concealed from the German personnel. The result was that volunteering fell off and it became necessary to draft men from the high seas fleet at Kiel into the submarine service.

From October, 1915, until the month of March, 1916, German submarine activities were very much restricted. The two crises that had arisen with America over the *Lusitania* and the *Arabic* were in themselves sufficient to make not von Tirpitz, but the German Government, hesitate to go to extremes. But by March, 1916, a great many of the new program boats were ready and von Tirpitz was agitating to get to work on a ruthless campaign, and, in a famous phrase, to damn the consequences. So well did he, Reventlow and the Pan-Germans work their agitation that when this campaign was forbidden by the higher command and Tirpitz dismissed, there was a violent reaction of public opinion and von Capelle was ordered to carry out the very campaign for insistence on which von Tirpitz had been dismissed.

This campaign, as everybody remembers, ended after President Wilson's note over the *Sussex* case. A great number of boats were engaged, and here again there had been considerable losses, and the discontent in the German Navy with the commandeering system grew to still greater proportions. It is this discontent that largely explains the very exaggerated claims to victory made by the German Emperor and the Chancellor in the Reichstag after the German flight from the field of the Jutland battle. Vital as it was to keep up the spirits of the German people, crucial as was the importance of getting a new credit through the Reichstag without discussion, the third object, the maintenance of discipline and high morale in the German fleet was one that could not be neglected.

It was undoubtedly an object with the German Admiralty to re-establish the credit of the submarine, not only with the German public, but with the German Navy, and it is this that very largely explains why in June, July and August the main submarine campaign was carried on in the Mediterranean and not in northern waters, for in the Mediterranean the anti-submarine provision was necessarily far less efficient than nearer home. The success of the U-boats in southern waters made the opening of the

autumn campaign in northern waters easier, but secret reports from Germany have always conveyed the impression that sooner or later the personnel of the German Navy would recoil from the task set to the underwater fleet, not, of course, on account of its inhumanity to its victims, but because the toll of the Germans in lives would become insupportable. The surprising thing, therefore, about this Kiel mutiny, is not that it occurred in the first week of September, but that it was not until September that the thing happened.

The unpopularity of the submarine campaign is, of course, by no means the only cause of the mutiny. It is sufficient to say that there is no aggregation of men of the working classes of Germany to-day that is not bitterly opposed to the continuation of the war. But in the munitions factories and at the front the men are kept under stern discipline, and, what is far more important, are worked to the limit of their capacity day after day.

With the bluejackets and marines the case is different. The ships that lie in the Kiel Canal for safety are normally denuded of their crews, who are kept in barracks at Wilhelmshaven or Kiel. They are in all probability the idlest class in Germany. This would be bad enough with men sharing the discontents of their class. But it must be remembered that Kiel has from the beginning of the war been the most disaffected of all German towns. In the last eighteen months two serious outbreaks of rioting have taken place, followed by savage sentences on the ringleaders and selected participants. It is a bad atmosphere for men who can add a professional grievance to the loathing for the whole war which all the German proletariat now feel.

The most interesting problem to the student of naval warfare is, however, not the sociological crisis that the blockade and the general military failure must produce in Germany, but the precise value of our anti-submarine campaign in thwarting the progress of the U-boat. In common with other observers I have supposed that the turning point in the campaign, which occurred about the second week in September, was due, not to any falling off in the intensity of the German attack, but to the improved methods with which that attack was being met by the British and American navies. But clearly if the decline arises from the inability of the German Admiralty to maintain their attack at its former efficiency owing to the mutinous conditions it has engendered in the German fleet, then the conclusions we have drawn as to the character and success of the convoy and other systems on which we have relied may have to be revised.

This is not, of course, to say that these reorganized methods are not effective. It is only to say that the alteration in the results is not due solely to them. From one point of view, this mutiny, if, as I suppose, it is very largely due to the unpopularity of the submarine service, is extraordinary gratifying, for it is a kind of deferred dividend on the immense work which the British Navy carried on for so long almost single-handed against the German pirates.

It would, I think, be a mistake to build on this mutiny any hope of an immediate German naval collapse. Indeed an entirely opposite result is far more probable. When it comes to the assertion of discipline and the maintenance of military morale the German higher command has very little to learn; and we are far more likely to see some bitter intensification of naval activity than any cessation of activity as a consequence of the difficulties which have arisen.

The question has often been asked: Will the German high seas fleet ever come out again to fight? And the answer has commonly been given that it will not do so till public opinion drives it out. It has been supposed, that is to say, that just as Cervera was forced to give battle to Sampson and Schley and Villeneuve to Nelson, and Rodjestvenski to Togo, so Scheer and von Hipper might be compelled once more to try conclusions with the British fleet. A desire of the German people for naval action might compel action.

But we must not forget that public opinion cuts both ways, and if the German higher command sees a state of mind growing up in the German Navy which is dangerous it is quite capable of the desperate resolution of sending the fleet out to battle, if only to cure it of its megrims. Take it for all in all, the situation is replete with the acutest kind of interest.

Details of Mutiny.—Mr. George Renwick, correspondent of the *N. Y. Times,* cabling from Amsterdam, October 12, says:

"Vice Admiral von Capelle's revelations regarding the insurrection in the German fleet give point to some statements which have been coming recently from Germany, but which, arriving singly and being apparently isolated and somewhat dubious rumors, could not be connected with anything so serious as what undoubtedly happened.

"Some information may now be added which is believed to be thoroughly reliable. There has been no little talk in Germany of late regarding the almost complete inactivity of the German fleet in the Baltic against Russia at a time when there were obvious opportunities. It is a fact that the insurrection took place on at least six important units of the grand fleet and that it not only put these ships out of action, but caused the authorities to doubt the discipline and loyalty of the crews of other large ships. For that reason it was deemed inadvisable to embark on any action involving the use of battleships.

"The naval authorities also decided that they dare not take the sternest measures on anything like a large scale, because it was clearly evident that the use of a strong hand would have had the effect of increasing the evil. They saw they could not uproot the evil and so had to be content with pruning it.

"The number of men condemned to death probably does not exceed a half dozen, but the step was taken of completely changing and intermixing the crews, separating the worst offenders, and throwing several scores of sailors and marines into prison, which could be done with very much less publicity than the carrying out of sentences of death.

"The seriousness of the events is shown by facts brought out in the Reichstag and in comments in the press. 'With the object of handing the ship over to the enemy' fairly and literally describes what was attempted in more than one case. Accurate details, of course, are not likely to be available, but there is reason for the belief that attempts were made by the crews of ships at sea to depose their officers and make for neutral ports.

"Travelers from Germany have told on several occasions stories of the difficulty which the German naval authorities experience in getting submarine crews together, but that difficulty was got over, it seemed, by extra pay, good conditions of life, and liberal leave. That there should have been trouble in obtaining such a comparatively small number of trustworthy men is significant.

"The discontent undoubtedly was started by inadequate food provision. In this case it is interesting to recall that the first serious food troubles occurred at Kiel, and some time ago the food scarcity extended to the fleet.

"A traveler from a German port recently said here that his talks with German sailors had convinced him that the battle of Jutland had a considerable adverse effect on the sailors of the grand fleet. They know now that the British fleet is far superior and that going out to fight it means something like going into a trap. The long enforced idleness has tended to sap the men's activity and spirit, seeing that it is accompanied by hard conditions.

"Additional details have reached me as to the beginning of the insurrection in the grand fleet. The trouble first manifested itself about eight months ago at Wilhelmshaven.

"It was noticed that the crews of several vessels were in a state of considerable nervous tension, but this was first attributed by the officers to

understandable results of the long enforced inactivity and to the wish that 'something might happen' to relieve the monotony. As was afterward discovered, however, this state of feeling was really caused by agitation carried on mainly by sailors of the reserve class.

"That agitation started on board the battleship *Westfalen* at Wilhelmshaven, and quickly spread to other vessels. It was on the *Westfalen*, too, that insubordination first broke out one morning. One of the older sailors on the *Westfalen* was ordered to do a certain piece of work. He refused pointblank, and when the midshipman asked him for his reason the man replied, unwillingly, that he was too ill to perform the task. A superior officer was called, but the man persisted in the refusal to obey the order. The case was then referred to the captain, who had the man put under arrest.

"On the following day a deputation from the crew, headed by a petty officer, waited on the captain and asked for the man's release. The captain asked the deputation to explain their action, regarding which he expressed his astonishment and anger. The spokesman replied that the crews of several battleships had decided on the formation of a sailors' council on the lines of the Russian Soldiers' and Workmen's Council.

"The captain, however, was unable to obtain any particulars from the deputation regarding the scheme and ordered the men to leave the room. They refused to do so.

"The captain during these proceedings was accompanied by two officers, and when he became aware of the seriousness of the situation he sent one of them ashore to report to the naval authorities. When this officer had departed the deputation was joined by a number of other men and the captain and other officers were locked up in the cabin.

"The men involved in the matter posted guards and cut off that part of the ship containing the captain's room, refusing permission to the officers or other men to pass.

"Meanwhile the officer who had gone ashore reported the happening to the naval authorities, and a strong military force was sent aboard the ship. The rebellious sailors refused to yield to persuasion, and only when force was threatened and was about to be applied did they surrender.

"Investigation followed and there proved to be about 300 men involved in this particular mutiny. Of these about 30 were sentenced to death, but only three were executed, the authorities seeing plainly that any sterner measures would only heap fuel on the flames of discontent and anger.

"Before the execution of these men, it is stated, they divulged all the secrets of the plot regarding which my informant says only the most unimportant details were disclosed by von Capelle in the Reichstag. He was driven to disclose something by the fact that the details of the business were becoming widely known and the government deemed it best to reveal a little with the aim of calming the public mind and getting rid of the truth by an official version.

"Something similar happened on another battleship while she was out on a cruise. The men on that ship obtained control and were only prevented from running into a neutral port by the presence of other German vessels, which got wind of the occurrence and threatened to open fire unless the ship returned with them to port.

"In this case two (another report says three) men were shot. Prompt action had been taken on other ships, and for some time several battleships lay at Wilhelmshaven without crews aboard.

"All the Socialist literature aboard the ships at Wilhelmshaven and other ports was seized, but was found to consist of nothing more serious than pamphlets, which had been passed by the censor, and which any sailor could buy in the shops ashore, thus providing another proof of the flimsy nature of von Capelle's charges against the three Socialist Deputies of the Reichstag."—*N. Y. Times*, 13/10.

PENALTY FOR REFUSING U-BOAT DUTY.—Reliable reports received in London by way of Holland indicate the growth of a strong disinclination on the part of German seamen to serve on submarines.

This news, the authenticity of which is not doubted, is to the effect that several seamen already have been shot for refusing to perform U-Boat duty.

The shootings are said to have occurred prior to the mutiny in Wilhelmshaven.—*N. Y. Times,* 13/10.

ADMIRAL VON CAPELLE RESIGNS.—Vice Admiral von Capelle, the German Minister of Marine, has resigned, according to the *Frankfurter Zeitung.*

Vice Admiral Eduard von Capelle was one of the administrative directors in the Ministry of Marine before the war and had served as a captain at sea. In March, 1916, he succeeded Admiral von Tirpitz as Imperial Minister of the Navy. Several times since then von Capelle has appeared before the Reichstag with optimistic statements regarding the progress of the unrestricted submarine campaign as late as August 26, 1917, defending the U-boat policy of his predecessor and himself at a meeting of the Reichstag main committee.

Vice Admiral von Capelle announced in the Reichstag October 10 that a plot had been discovered in the navy to paralyze the efficiency of the fleet and force the government to make peace. He said that the guilty parties had received their just deserts, and attempted to link socialists with the plot. The Imperial German Chancellor, Dr. Michaelis, also spoke of the existence of a conspiracy in the navy and asserted that certain deputies were involved in the revolt.

The socialists and their newspapers have attacked both the Chancellor and the vice admiral for their statements.—*Washington Post,* 12/10.

UNREST RACKS NAVY.—That the German Navy is full of the spirit of revolt is the statement contained in a cable dispatch to the *Chicago Daily News* October 16 from Edward Price Bell, its London correspondent. The assertion is made by Peder Pederson Dahlgaard, who was a sailor on the German battleship *Kaiser* at Kiel until last June, but who escaped and has just arrived in England.

"There is a serious unrest in Emperor William's navy," said Dahlgaard to the *Daily News* correspondent. "It arises from the belief of the sailors that Germany has lost the war and that further fighting is a crime against the German people. I do not think this feeling prevails to the same extent in the army, but it is by no means unknown there.

"Riots in the German Navy began months ago. In April I heard of an outbreak on the *König Albert.* The sailors on that ship are said to have seized a watchman, tied him to an anchor and sunk him. Two hundred and fifty of the men were sent to prison in Cologne. Similar actions were planned on other ships.

"No civilized Government besides that of Germany ever imposed such discipline upon men as the German naval commanders impose. Officers beat the sailors sometimes out of pure savagery and think it perfectly right to call them dogs and spit in their faces.

"I have heard officers say that the Allies need not fight another battle in order to beat Germany. All they had to do, these officers said, was to hold fast and wait another six months, when famine would force Germany to surrender."—*N. Y. Times,* 17/10.

VICE ADMIRAL CAPELLE AND THE MUTINY.—Commenting editorially upon the mutiny and the resignation of Vice Admiral Capelle, the *New York Times,* October 14, said:

"The German Government is so proficient in the art of creating pretended 'crises' for effect and then suppressing them that the world

has grown wary. It bit too often at the bait. And yet some day there will be a real crisis in Germany, and the joke will again be on the world if it prove skeptical at the wrong time. The revelation of the sailors' mutiny was made by the government, and therefore is open to suspicion as a political dodge; but still there are certain facts that make for the belief that this time something may be really going on in Germany.

"Capelle's resignation is too solid a fact. The demand for Michaelis's resignation is another solid fact. If it is said that the mutiny was revealed as a political stroke to save Michaelis's head, that head must be in desperate danger to need such heroic measures. The incident as a whole has led the Socialist press to take more advanced ground in its demands than it has ever taken before, and that is another solid fact; a bogus crisis has never had that effect. We now see *Vorwärts* demanding that the next chancellor be chosen by the Reichstag, not by the Kaiser; in other words, demanding that parliamentary government be adopted without waiting for a change in the constitution. The mere fact of the demand shows the distance that has been traveled.

"Whether the mutiny was great or small, a mutiny there was. The government charges that the mutiny was fed on Socialist literature. If that is true, then that Socialist literature must be making its way into German homes as well as German warships. If it has an incendiary effect on sailors, may it not have an incendiary effect on others? Deputies give the names of persons who have been arrested for inciting the sailors, one of them a deputy himself. Then there is sedition in Germany. That is another solid fact.

"How large or how slight was the revolutionary movement in the navy? There are two facts that may tend to strengthen the belief that it was not slight. The German Navy certainly did begin a movement against Russia, and did not carry it out. Was it because its sailors could not be trusted? The submarine campaign certainly is failing in effect. We have all been attributing it to the increase in effectiveness of the measures taken by the Allies. Is it not possible that this, too, may be due in part to distrust of the men by the officers? The mutiny was on battleships, not submarines; but the crews of the submarines are being drawn from the larger vessels, the very vessels touched by disaffection. A German sailor who has been reading seditious or Socialist literature for several months is just as likely to be affected by it if he serves on a submarine as if he serves on a cruiser.

"There is another fact, one that has an inescapable meaning. German sailors on the battleship *Westfalen* took possession of the ship and imprisoned the captain in his cabin. Such an action could not possibly have been sudden, could not possibly have failed to be preceded by many signs and warnings. A battleship is not a submarine or a rowboat; it is a great ship with hundreds of men on board. It would no more be possible to miss the signs of rebellion on a battleship than in a city. In the old state of discipline in the German Navy a rebellious movement could never have got without discovery to the point where the crew could take the ship and captain prisoner. It did not spring from a clear sky. What is the present state of discipline in the German Navy?

"Two things we know. The government proclaims that at least a part of its navy cannot be trusted; and the head of the Navy Department resigns immediately after that revelation. It would be premature to form any large conclusions from the little we know; but it is not too optimistic to believe that all this may be the beginning of important events."

PREDICTS GREATER REVOLTS.—In its comment on the news of the revolt in the Kaiser's navy, the *New Yorker Volkszeitung*, Socialist, said October 11:

"The latest news from Germany about the mutiny of the crews of five warships will make the heart of every lover of liberty, of every honest opponent of war, jump with joy. The thing that we had expected for years

in anxious suspense, that we all had longed for with impatience, is coming. At last, after forty long months of terrible events, the first clear signs are shown of the revolutionary rising of a people scourged with a whip of scorpions. The first gleamings of the approaching dawn are lighting up the international sky.

"It is true that the attempt at revolution failed; German militarism does not allow itself to be fooled as easily as the clumsy Russian bear. Some of the sailors and marines who took part in the revolt were shot—and how characteristic it is that the 'great peace Kaiser and friend of the people,' Wilhelm by Divine Right, demanded a greater number of executions than did even the Prussian bureaucracy—or were sentenced to long terms of imprisonment. But their sacrifice was not in vain, for now the German people have finally learned what conditions are in the fleet, and they will know how to draw conclusions as to how things must be among those proletarians who for three years have been spending their lives in the damp trenches.

"What formerly was endured in gloomy resignation because no escape, no possibility of help, was to be seen, will from now on provoke resistance and active self-defense. The consciousness that the fleet is against the war and that its members are even willing to sacrifice themselves for the sake of peace is bound to awaken the lost love for liberty of the German people and will cause the Wilhelmshaven attempt to be followed by new and better planned revolts."—*N. Y. Times,* 12/10.

CAPTAIN MÜLLER DIGS WAY OUT OF BRITISH CAMP.—One of the most daring escapes from internment camps was effected September 25 at Kegworth, Nottingham. Twenty-two German prisoners, including Captain Müller, who commanded the cruiser *Emden,* and Lieutenant Otto Thelan, disappeared through a tunnel extending from a hut in the camp to a point outside the barbed-wire fence. How the tunnel was dug is a mystery.

Nine of the prisoners were recaptured, including Captain Müller and Lieutenant Thelan. The latter made three previous escapes. With Lieutenant Emil Tehmann, another of the recaptured prisoners, he fled from the detention barracks at Chelmsford last May. The Germans made dummy locks of cardboard, substituting them for the locks of the cell doors. Dummy figures to deceive the sentry were made from bedclothes and some of their own garments. To make these figures the more realistic they were decorated with shocks of hair from their mattresses.—*N. Y. Herald,* 27/9.

THE "NINE MILLION" EFFECTIVES.—Hilaire Belloc, the military expert, writing in *Land and Water,* September 6, said:

"I have been written to by many people about Mr. Gerard's expression, 'Nine Million Remaining German Effectives,' appearing in the memoirs he is now publishing. I should like to say in the first place, that the criticisms I have to advance against this expression in no way detract from my appreciation of the excellent work which Mr. Gerard has done as a public witness in this grave trial of all Europe.

"Why must we regard this one phrase, 'Nine million remaining German effectives,' as wholly inaccurate?

"Before answering that question let me remind the reader of the way in which we naturally receive any impossible statement made upon high authority.

"If a man highly placed in the Hydrographic Service of some government writes of the Straits of Dover: 'The deepest soundings are but 100 fathoms or so,' we do not, whatever the repute of the writer or his special opportunities of knowledge, accept the statement. We know that it is, as it stands, nonsense; we cast about for some explanation. We say to ourselves, there may have been a slip of the pen; if the information is in type, we may refer it to a printer's error; or we may find that the straits

intended to be mentioned were not the Straits of Dover at all, but some other deeper channel, and that the word 'Dover' came in by some error in writing or dictating, or in correcting proofs. A mass of long-known official statistics, to wit, the numerous soundings taken in the Straits over centuries, make us perfectly certain that the sentence as it stands is meaningless; no part of the Straits of Dover is within much more than a *third* of the depth stated.

"Now that is just what a man whose business it has been to follow the statistics of this war feels with regard to the statement that 'German effectives are still nine million in number.' The German effectives—in the sense of combatant units—are perfectly well known. They are somewhat over *three* million (at the most three and a quarter), organized in divisions and lesser units, the numbers and positions of which have been ascertained and are followed minutely as the war proceeds. Behind these effectives is an organized reserve power of men in depot, now very considerably less than half a million (at which figure it stood ten weeks ago), but to be increased in a very few weeks by the greater part of class 1919 and before the end of the year by nearly the whole of that class.

"When we read, therefore, that "The remaining German effectives are nine million," we cast about for some explanation of how the statement could have got into print—what sort of typographical or other error explains it.

"The word 'effectives' is generally used to mean the men organized in units for combatant service—the actual fighting force. For instance, when you are told by a military historian that 'Napoleon had a difficulty in keeping up his effectives in 1814,' the phrase refers to difficulties in the upkeep of combatant forces in the field—the filling of gaps resulting from death, capture, sickness and wounds on active service. It is not a word of that precise scientific or technical value which words often acquire after long service, and one can easily conceive that one source of error in the remark we are criticising might be the loose or double use of the word 'effective': first to mean mobilized men in general, and next to mean of active service alone.

"Whether the word 'effectives' has been used first loosely and then technically, thereby creating a confusion, or whether it has been used throughout to mean the fighting forces alone, is of little consequence to a true statement of the position. The statistics of this are well known. There is no debate upon them save with regard to comparatively small margins of error. A few weeks only of further fighting have modified a position which, towards the beginning of July, stood somewhat as follows:

"(1) Total ration strength of the Germany Army about five and a half million (or a little under). To show upon what points doubt exists, I may mention that the lowest estimate I have seen is for 5,435,000 (which is that of a high French authority), and the highest but just under 5,600,000. It is clear that a slight difference in date, or the inclusion of one very doubtful category (say, the ladies who are on the ration strength doing typewriting), by one authority and their exclusion by another, would be sufficient to account for these small differences. At any rate, if we put the present ration strength of the German Army at five and a half millions, we are probably just a little over the right figure at the present moment.

"(2) Of this large body, the only part which counts in our calculation of fighting strength is the organized combatant active force, and is about or perhaps at the present moment a little under three and a quarter millions. This is what would normally be called the 'effectives.'

"(3) Of the balance of somewhat over two millions, and perhaps nearly two million and a quarter, the great bulk are made up either of men who are used to garrison, to supply, etc., but are too old to be used in the field (save a few exceptionally here and there), or of men so affected by war in the way of wounds and illness that they can only be used for similar auxiliary purposes. These last do not count among 'definitive' losses,

that is, they are not out of the army for ever as are the dead, the prisoners and the discharged from very bad wounds or illness; but then, neither are they capable of active service in the future.

"The only part of this balance between the total ration strength (five and a half million) and the army in the field (three and a quarter million) that counts in the active strength of the enemy is the number Germany has in depot; that was in June last under half a million—excluding class 1919. By some British accounts this reserve is by this time so depleted that the first of class 1919 have begun to appear in the battle—but they are barely due, and it is probable that prisoners of 1919 are volunteers. This class was expected rather in the beginning of September than at the end of August, and they will probably dribble in during autumn—to the extent of 350,000 or thereabouts. This is not the whole of class 1919. The remainder of it, to the extent of 140,000 or a little more, were put back as immature for later training, and most of them will presumably appear in the winter.

"Such is, in rough figures, the situation of the enemy as regards effectives, that is, in combatant numbers. There is no mystery about it. The figures are perfectly well known and generally dealt with all over Europe by those who concern themselves with close and rational study of the campaign. They are based, of course, upon the convergence of many different kinds of information, all grouped under the Intelligence Departments of the various belligerents.

"Twenty-one German classes were put into the field in the first months of the war—classes '14 to '94 inclusive. They included the young men in their 20th year and up to men in their 40th year. These classes, 1914 to 1894 inclusive, came from men born during the course of 1874, during the course of 1894, and during the course of the intervening years.

"Apart from these, five older classes from 1893 to 1889 inclusive, that is, men from their 41st to their 45th year inclusive, were summoned as liable to military service, but not used in the field save in exceptional circumstances and in small numbers.

"The total number of men born from 1874 to 1894 inclusive, and still alive when Germany declared war was, omitting figures under a thousand, 10,757,000. Of the youngest class, under normal conditions, about three-quarters are fit for service. The elder, of course, as one approaches 40, tail off rapidly and come down through less than five-eighths to little more than half. The total number normally available for active use, within the 21 classes, was over seven, but rather less than seven and a half millions. Of these, a certain proportion, probably about a million and a half, were not mobilized in the first months, but kept back for civilian work.

"With the second year of the war, or rather a little before the beginning of the second year of war, what is called 'abnormal' recruitment began in Germany—as it did somewhat later elsewhere.

"It took three forms. (1) The combing out of what could possibly be spared from civilian occupation among the fit; (2) the calling of the younger classes; and (3) the combing out of the 'unfit,' that is, of those who under normal recruitment are rejected.

"The first process was largely aided, some months later, by the beginning of the slave raids organized by the enemy in the territories he occupied.

"The second, which was begun in October, 1915, could not in the nature of things yield any very large body of men, though, as the pressure increased with every passing month, the combing out process become more and more severe.

"It was the third source, the younger classes, which formed the backbone of the recruitment to replace losses, but it gave—even under extreme pressure—not more than the three-quarters which we get in normal recruitment. The reason of this is that if you take an immature class below 20, though under pressure of war you lower your physical standard of *health*, you have a larger number of boys who must be kept back before they are fit to

serve, from lack of growth, and the gain in numbers due to the lowering in the standard of health hardly balances the loss due to immaturity.

"We know, for instance, the statistics of the last class called out, class 1918. It bears out this case exactly. The number of boys of this class alive on the 1st of last January was, omitting the figures below a thousand, 685,000. The total number gathered for military service of every kind was just on the 500,000, which is just 2 per cent below the standard figure—three-quarters of the whole of the class.

"If you take the mere census figure of all the adults, from the men who were 40 when the war broke out, down to the lads who are 19 this year, you get out of the total number alive at the moment of recruitment, a total *mobilizable* force for active service of about nine and a half millions. It corresponds very closely, population for population, with what Great Britain has found possible (counting naval services and exemptions for auxiliary work) and with what France has found possible. It corresponds also to the known present ration strength of the German Army and to its known definitive losses, just on five and a half millions for the first and just over four millions for the second respectively.

"To sum up: Germany has used for active service numbers which have already reached more than nine and may approach nine and a half millions and will, when 1919 has fully come into the field, reach perhaps to nearly ten millions. Of these her remaining active force in the field is just over three million, say, three and a quarter at the most—with reserves behind it of somewhat less than half a million, excluding class 1919. The balance can never again appear in the field.

"These things being so—the active effectives available three and a quarter millions—it is not without interest to enquire how the error in the statement we are submitting to examination, the curious 'nine millions' arose.

"Mr. Gerard was told by the Germans that they had mobilized twelve million men, first and last. This is roughly true. Counting class 1919, they have called up, even where they have not actually put into uniform, ten million men up to the age of 40, and the number of men in the classes over 40 alive at the beginning of the war came to not far short of two million more.

"But that has nothing to do with 'effectives.' That is, only the total number of men put under the orders of the War Office in one form or another, or even warned that they may be called to service. It includes the older classes who cannot be used in the field as well as the classes that are. The intention was obviously to give the impression of a great fighting force of twelve millions raised since the beginning of the war and to call up a picture in the mind of this enormous body all organized in combatant units—the remaining strength of which to-day could easily be calculated by merely subtracting losses in the field. It is as though one were to take a business man's gross receipts since January 1 and pretend that his present balance at the bank would be got at by deducting from that total his domestic expenses alone—and those faked.

"I have noticed this startlingly simple method of deception in nearly all the German statements made for purposes of propaganda. A piece of statistics is given which is true—when words are used in a certain sense. This statistical information is then applied to the situation, *but using words in another sense;* then the false conclusion is arrived at without the painful necessity of detailed corroboration.

"For instance, the world was startled to hear quite early in the war that the German hospitals performed the miracle of returning to active service all the sick and wounded soldiers who entered them, with the exception of a trifling 11 per cent.

"The truth was that *of those who survived* after entering hospital, only 11 per cent *were given their final discharge* by the army authorities upon leaving hospital; all the rest of the *survivors* were kept on the lists of the army—no matter what their condition. Some were either discharged later

on as hopelessly unfit, others were put to auxiliary work, no matter how light; only the balance—not 89 per cent at all but more like 60 per cent, returned to active service. The proportion of the latter, as we know from the rate at which the German classes have been called up, and from every other source of information, has been pretty much the same as among the other great belligerents—which, after all, is what one would expect—but it is astonishing what a number of people were at first taken in by this monstrosity of '89 per cent hospital returns.'

"In the same way the total of twelve million summoned to military service of one kind or another—which included class 1919 not yet trained and the older classes never put into the field—was taken as the basis of calculation. It was true for all men put under the military authorities from first to last, from the beginning of the war to the present day, for any purpose whatsoever, and was then used as though it were true of the active army in the field, which is a totally different thing. The German authorities having got that figure of twelve million accepted for something which it was *not*—that is, for the active army in the field, proceeded to argue that there must remain as many 'effectives' as would result from a simple sum in subtraction: the subtraction of their 'losses in the field.' Even if this last item had been accurate, the method was false: but the item of losses given to Mr. Gerard was not accurate; it was even ridiculous. For, as we shall see, it had the following features:

"(1) While it gave fairly accurate account of prisoners (available, remember, from other sources to a neutral diplomat).

"(2) It understated the dead by at least a quarter of a million (at the same time giving the lie to its official lists by *half* a million the other way).

"(3) It absurdly reduced the numbers off the strength from wounds and sickness.

"(4) It wholly suppressed the number of sick and wounded which, while kept on the books of the army, cannot be returned to active service.

"To begin with, they told Mr. Gerard that 'there were only a million and a half dead.' It is worthy of remark that at the very moment they were making this statement (I presume during last March at the latest, or perhaps in the very first days of April) the German authorities were publishing in their official lists the statement that there were far less than one million German dead! Even to-day the last lists (covering July, 1917) allow for only 1,030,000 dead!

"The value of this sort of statistics may be tested by that one example alone. The real number at the time was about one and three quarters millions or a little less, for by the end of May it was about 1,750,000 to 1,800,000.

"The next item they admitted was men incapacitated for active service by wounds and sickness. They gave the number of these at half a million! That is, for *three* men dead, only *one* was incapacitated for service by sickness or by wounds! Such a statement is merely fantastic. The real figures are roughly these: that the dead come to a little less than half the definite losses at any moment, the remainder being made up of men permanently incapacitated and prisoners.

"Of prisoners Mr. Gerard's informant gave him a half million; a further half million of hospital cases (I think) was thrown in as a make-weight . . . . and there the information stopped! These imaginary figures added up and came to three million sure enough. Not a word was said of that very large item—nearly equalling the number of dead—the casualties which, though not leading to discharge, failed to return to active service. Only the imaginary three million were mentioned. They were deducted from the supposed twelve million effectives, and left the balance of nine million with which so many have been amused and astonished.

"It would be, perhaps, a waste of space to point out the numerous other ways in which the true figures can be established, and the enormity of the error emphasized.

"For instance, if Germany had nine million effectives to-day, she would, at her present establishment to a division, have at this time in active organization something like 600 *divisions*.

"Or again, if she had nine million effectives it would mean that she had been losing at a rate of about *one-third* that of the French and the English (as, for instance, at Verdun and at the Somme)!

"Or again, it would mean that after three years of war she was able to put into the field, of her total population, nearly as many men, proportionately, as all the other fully mobilized belligerents had been able to muster *from the very beginning*.

"Or again, it would mean that she had had no losses at all since the spring of 1915.

"P. S.—Here is a little note which will, I think, interest those who have appreciated the real state of military losses in the German Empire.

"One comes in enemy reports and newspapers upon the phrase: 'Over a million war widows.' It is clear that the insurance work (government and private) and the other forms necessary statistics kept, made that phrase general in the early part of this summer; and it is equally clear that the phrase corresponds to some general and wide-spread information. Particular figures are not given, but these general terms are commonly repeated: 'Over a million war widows.' They are used in arguments in favor of an early peace; in rhetorical descriptions of the horrors of war; in dry calculations of expenditure and strain.

"Well, it is interesting to remark that the proportion of married men in the German forces mobilized since the beginning of the war for *active* service, that is, the classes '94 to '18 inclusive, is something between 52 and 53 per cent. In the younger classes there are, of course, very few married men indeed. In the youngest of all not 1 per cent. In the older classes the proportion gets steadily higher, until one reaches the oldest class with a proportion of nearly 80 per cent, and the average, if you take the whole lot and number them separately, is just over one-half: 52 to 53 per cent of the Germans exposed to death from this war are married men.

"In other words, the admission of just over a million war widows exactly corresponds to that figure of just on two million German military dead which we postulated for June.

"It is only one other example of the way in which true statistics always converge to prove the same general result within a small margin of error, whereas false statistics can always be exposed if one is patient enough to lie in wait for the points in which they give themselves away."

THE NEW GERMAN BATTLE CRUISER.—According to a Berlin telegram, a large cruiser was launched at Danzig on Saturday, the 15th inst., and named the *Graf von Spee*. This may be the vessel authorized under the normal estimates for 1914 as the *Ersatz Viktoria Luise*, as it was reported in July of that year that the contract had been awarded to the Schichau firm at Danzig. On the other hand, it seems improbable that the vessel would have been three years on the building slip. The *Graf von Spee* may, therefore, be one of the capital ships of the war program, and, in any case, the announcement of her launch is interesting, for it dispels the widely held idea that for the past two years or more German naval construction has been confined entirely to submersible craft.

We have no means of ascertaining how the experience of actual warfare has influenced the views of German designers, but the possibility that this ship was laid down after the retirement of Grand Admiral von Tirpitz from the Ministry of Marine suggests that she may have been designed on principles which differ from those advocated by the late Naval Secretary. Herr von Tirpitz, as is well known, strongly favored a medium armament for capital ships, and it was under his direction that all the dreadnought battleships laid down before 1913 were armed with 11-inch or 12-inch guns. The German battle cruisers building at the outbreak of war were to carry

eight 12-inch guns, while the preceding ships carried ten 11-inch. We do not know whether German experts still retain their faith in medium guns, but from the semi-official accounts of the Dogger Bank and Jutland engagements published in their press, it did not appear that either of these actions had convinced them that the inherent superiority of the larger caliber pieces mounted in the British fleet was sufficiently pronounced to justify the great displacement and sacrifice of armor necessitated by the adoption of such guns. Nevertheless, the large cruiser—which in German naval nomenclature signifies battle cruiser—just launched at Danzig, is understood to be armed very heavily. A report published in Washington 12 months ago on the ships of war then building in Germany credited all the capital ships, battleships and battle cruisers alike, with a 15-inch armament, and, if it is accurate, the *Graf von Spee,* presumably, mounts eight of these weapons. The 10-inch armor belt of the *Von der Tann* was increased to 11-inch in the *Moltke* class, and to 12-inch in the *Derfflinger.* In the American report, alluded to above, the *Hindenburg* was given 14-inch armor on the water-line and 12-inch on the gun turrets. Extremely stout protection has been a distinctive feature of all German battle cruisers, and doubtless the *Graf von Spee* is no exception to this rule.

If this vessel is completed without undue delay, she ought to be in commission before the end of next year. Owing to the intense secrecy observed by the Germans with regard to their losses at Jutland and in other engagements, it is impossible to estimate with any certainty the present strength of their battle-cruiser squadron, but there is no reason to believe it comprises more than six units, if as many. As we have remarked, the news of the launch of the *Graf von Spee* at Danzig is mainly interesting as an indication that Germany has not wholly abandoned the building of capital ships in favor of submarines.—*The Engineer,* 21/9.

GREAT AIR RAIDS PLANNED.—Ryley Grannon, writing in the *Washington Post,* September 21, on the conditions in Germany, said in part:

"Through a neutral I have acquired some idea of the internal situation in Germany as it existed on September 1.

"The Kaiser is in good health but is showing his age. His energies are somewhat impaired. Hindenburg is the pillar of the people's hope. The people as a whole are absolutely devoted to William Hohenzollern. They regard any suggestion of deposing him or the Hohenzollern dynasty as an enemy attack. . . . .

"The supply of war materials is good. War factories are working night and day. The greatest activity is in aircraft production. The four standard types of airplanes are being turned out by thousands. German gossip has it that there will be an air offensive in May that will stagger humanity, and especially in England. Zeppelins are also under construction, especially a new type made of processed wood fiber instead of aluminum. The contract for these new machines amounts to $45,000,000. . . . .

"The submarine controversy flames up and dies down according to circumstances. Admiral von Tirpitz is roundly abused because he did not foresee the possibilities of the submarine. When the war broke out he had only 15 or 20 submarines, and was on record as saying that they were more or less of an experiment. Last month he was viciously attacked by a Hamburg newspaper, which said that if von Tirpitz had been on his job the war would have been won by submarines by the summer of 1915.

"The people no longer look for victory from submarines, but they count them as valuable aids. Submarines crews are heroes wherever they go. All sorts of stories are told of the atrocities committed by enemy merchantmen against the poor submarine sailors. . . . .

"Since the Russians became erratic the Teutons are using the Black Sea with considerable freedom for transporting stuff to Turkey. The goods are sent down the Danube and along the coast. Submarines are in the Black Sea and the Germans ask frequently why they do not blow up the Russian Black Sea fleet."

FAMOUS GERMAN AVIATOR KILLED.—The body of the famous German airman, Lieutenant Vosse, who recently was reported in a German official communication as missing, has been found within the British lines, and British airmen already have dropped messages behind the German front giving notification of his death.

Lieutenant Vosse was killed on September 23 while engaged in a spectacular combat with a British airman. He died fighting determinedly and magnificently. It is a peculiar coincidence that the famous French airman, Captain Guynemer, lost his life about the same time in battle over enemy territory, and was reported missing until the Germans found and identified his body.

The opponent of Lieutenant Vosse is one of the most brilliant British aviators, who for the purposes of this narrative may be referred to as Brown—that not being his real name. Here is the story:

A number of British aeroplanes were patrolling on September 23, flying at a height of 7000 feet, when one of them was attacked by a German red-nosed Albatross and a triplane. It appeared later that Vosse was the pilot of the triplane. Two other aeroplanes rushed up and engaged these two, with a third enemy scout who appeared on the scene. About 11 other enemy aeroplanes were waiting at a distance to join in the fray, but did not attack, as some 10 British aeroplanes were circling about keeping them off.

The third enemy scout, who had joined in the combat, vanished, but the Albatross and the triplane fought in wonderful form. Brown singled out the triplane, and a hard fight ensued. Brown got in a number of good bursts from his machine gun, and several times had to change drums on the gun, so furiously was he firing.

For a long time the combatants circled, dived and maneuvered for position, and so close were they at times that only a few inches separated their wings. Eventually Brown got a little above Vosse and made for the triplane, the British airman working his machine gun steadily all the time.

Vosse passed Brown's right wing by inches and dived. The British airman wheeled into position and observed the German gliding westward with his engine shut off. He dived again and got a good shot at his opponent. He then followed this with a heavy burst from his gun and Vosse did a slight right hand turn and continued to go down until he disappeared.

This ended the adventure so far as Brown was concerned. He flew away, not knowing who his opponent had been or what had become of him. Later the shattered machine was found and the body identified.

There has been much hard fighting in the air recently, and the aviators have had some remarkable experiences. One British lieutenant had just forced the enemy to pull down a big balloon when he was engaged by machine guns from the ground. He dived on the gunners and fired more than a hundred rounds, dispersing the crew, who fled, leaving two of their number stretched on the ground. Continuing onward, the lieutenant had nine separate combats with enemy aeroplanes. Eight of these were indecisive, but in the other case he brought down a German.

In this last combat he got right on the enemy aeroplane, first killing the observer, then firing into the pilot and engines. The enemy aeroplane spun down to earth. The British airman engaged in still further fighting and returned home very much shot about, one bullet having pierced the ear pad of his flying cap.—*N. Y. Herald*, 3/10.

GERMANY REVISES DEFENCE SYSTEM.—A war correspondent transmitted the following article to the *Washington Star:*

The Germans, finding ordinary systems of trenches futile against the Allies' bombardments, are entirely remodeling their defensive organizations on new principles. These are outlined in a recently captured order, which reads as follows:

"Positions hitherto constructed, consisting of several continuous lines, have been regularly and methodically destroyed by the enemy at the be-

ginning of battles by the expenditure of formidable quantities of ammunition. Shelters situated in the old-style trenches, especially in the first and second lines, have been mere mantraps, and have frequently served merely to augment the number of prisoners.

"This demonstrates the weak point of the rigid defensive methods hitherto applied before and during battle. Strength in a defensive battle depends essentially on the precautions taken to hide all means of fighting from the enemy.

"These means of fighting—trenches, shelters, machine guns and battery emplacements—if they appear on aerial photos taken by enemy aviators, will certainly be destroyed by artillery. The violence of this artillery fire has prevented us from keeping our trenches in repair. All repair work only serves to exhaust the soldiers' fighting strength prematurely without repairing the damage as it occurs. Thus from the beginning of a battle other means of organizing positions must be employed. In other words a zone of defence organized to a considerable depth must be substituted for the old system of positions which can be located and destroyed by the enemy.

"This new system, with its organizations concealed as much as possible from enemy sight, with troops echelonned in depth, and whose density, feeble in front, is increased progressively toward the rear, should permit the passing from the defensive to the offensive with units from the rear.

"The idea of having continuous first-line trenches must be abandoned. These will be replaced by nests of shell holes occupied by isolated groups of men and machine guns. The occupation of these shell holes will be ameliorated by mine galleries or by connecting them with neighboring shell holes by tunnels. The earth removed will be thrown into unoccupied shell holes, or if the configuration of the ground permits will be scattered on the surface.

"Dugouts will thus be obtained, which, seen from above, resemble simple shell holes and will thus escape aerial observation.

"If the humidity of the ground prevents the use of mine galleries it will be sufficient to have simple shelters against shrapnel. Immediately behind the first line shell-hole centers of resistance for machine guns, shock troops and such reserves as have been sent forward will be installed. For this dugouts already existing may be utilized, but failing this the installation will be in the open.

"In front of the first-line shell holes an irregular belt of barbed wire will be placed as nearly continuous as possible. In the same way it is useful to fill the shell holes in front of the first line with barbed wire so as to prevent their occupation by the enemy.

"Farther back it is preferable to surround the nests of shell holes with barbed wire, for continuous belts might hamper action on our part. Use intensively obstacles destined to oblige the enemy to take the direction we desire and bring him under the fire of our machine guns. All defensive works should be concealed from the enemy. Too conspicuous work and continuous lines do not fulfill this important condition.

"Most of the reserves should be sheltered in the open in or near shell holes, in woods, hollows, etc., and wherever they may escape aerial observation. Villages must be avoided as much as possible, as experience proves that these draw the enemy's fire.

"Reserves should work methodically at the construction of a continuous position, comprising several lines, and concealed from the enemy as much as possible—behind hills, etc. This position will constitute a support for the defensive troops echelonned in depth in front thereof. It should be garnished with strong defensive barbed wire entanglements, with passages for about one-sixth of the garrison. Generally speaking, this position will serve to protect the artillery and will be from one to two kilometers (.6 to 1.2 miles) behind the first-line shell holes.

"Where there is sufficient labor new positions will be constructed farther in the rear on the same principles."

This important order, apart from the fact that it furnishes additional proof that the Germans are now definitely on the defensive, will repay careful study by the men now in training in America.—*Washington Star*, 28/9.

CONSTRUCTION OF MERCHANT VESSELS SUSPENDED.—The *Informazione* of Rome states that it learns from a German source that some months ago, in anticipation of the early end of the war as a result of submarine successes, the North German Lloyd and Hamburg-American companies began the construction of 20 transatlantic steamers, but that recently construction had to be suspended owing to the lack of materials and labor.—*Shipping*, 15/9.

GERMAN TANKS.—The Germans are experimenting with a tank armed with a 3-inch cannon and machine guns.

The forward end of the tank is fitted with a spur-like ram, while the upper part bears a superimposed cupola.

The armored plates descend sufficiently to protect the caterpillar wheels, which thus are almost invisible.—*N. Y. Times*, 4/10.

GERMAN NAVAL MINES.—That Germany would make free use of naval mines in case of war was confidently anticipated by those who were cognizant of her technical preparations. Her naval authorities were deeply impressed by the *rôle* of the mine in the Russo-Japanese War, and a special "mining section" was established at Cuxhaven in 1905. At the same time two fast vessels were designed exclusively for mine-laying, the *Nautilus* and *Albatross*, of 1950 tons and 2200 tons respectively and 20 knots speed. In addition, a few old cruisers were fitted out for the same work. The *personnel* employed in this branch of naval activity was very highly trained. A number of derelict Russian mines was picked up by a German cruiser at the close of the Russo-Japanese War and forwarded to Germany, where, to the astonishment of Admiralty experts, they were found to be much superior to the standard mine then used in the German fleet. This original Russian model was considerably modified and improved in course of time, but its essential features were retained, and are still to be seen in the German mine of the present day. According to a description in the *Journal of the United States Artillery*, the conspicuous features of this mine are as follows: (1) Mooring-rope reel on the mine, (2) primary battery in inactive condition in the mine, (3) electric battery electrolyte in a sealed glass bottle. The buoyant mine is attached to the anchor by a device locked with a sal-ammoniac plug. The mine and anchor are dropped overboard together, and both sink to the bottom, but when sinking the buoyancy of the mine breaks the fall of the anchor and thus ensures that the latter comes to rest in such a way as to give it the greatest possible holding power. The reel containing the mooring cable is fixed to the mine. When the sal-ammoniac plug dissolves the mine is released from the anchor, and a part of the firing circuit is closed. The ascent of the mine is regulated by a brake on the reel, and when it has reached the proper depth below the surface the decrease in the hydrostatic pressure releases a contrivance on the mine which clamps the mooring cable to the mine, thus keeping it at the required depth. The average depth at which it is sought to plant the mine is 10 feet, and the mechanism will operate within an error of ± 2 feet. Explosion is effected by electricity. The battery plates are dry, and the electrolyte is held in a sealed glass bottle. Several contact pins, or "whiskers," about 5 inches in length, protrude from the mine case. When one of these protuberances is struck by a passing vessel the shock is communicated to the glass flask and shatters it, allowing the electrolyte to run down and energize the battery. The firing circuit being closed, the electric current fires the detonator and explodes the charge. A slight delay is thus obtained between the actual impact of the ship against the mine and the subsequent explosion.

According to Rule VIII, Article I, Par. 2, of the Hague Convention, 1907, "It is forbidden to lay anchored automatic contact mines which do not become harmless as soon as they have broken loose from their moorings." To comply with this condition, the device on the German mine, which clamps the mooring rope, is released when the tension on the latter is removed, and as the same device contains part of the firing circuit, the latter is opened when the tension on the mooring rope is relaxed. A mine constructed on this system should, therefore, become harmless immediately the mooring cable parts, since the firing circuit is opened. Nevertheless, it deserves to be stated that a great many derelict mines of German origin have been encountered in which through inadvertence or of deliberate purpose, the safety device was out of order, making the machine just as dangerous to passing vessels as when it was properly moored below the surface.

As a rule, naval contact mines of the defensive type are linked up by a series cable connecting the anchors of a string of mines, so that by hauling in the series cable the anchors are raised in succession, and the mines rise to the surface, where they can be recovered. In heavy weather this operation is very dangerous. The Germans have evolved a system of raising the mines which eliminates most of the danger. The anchors are connected by a tripping cable, a pull on which releases a bight in the mooring cable and allows the mine to come to the surface in a harmless condition, as the relaxation of the tension opens the circuit. As a further precaution in lifting the mine from the surface a loop of wire in the firing circuit is placed in a convenient position on the exterior of the mine. This loop is cut with a pair of pliers before the mine itself is touched, thus rendering the machine perfectly safe to handle. The type of mine here described is considered to possess several marked advantages over the Elia and Sautter-Harlé models, which are used in many navies. It can always be relied upon to act in a proper manner, as the tumbling of the anchor and imperfect operation of the distance weight are eliminated. It may be cast into the water upside down, but will still adjust itself, and be in perfect working condition. It is as effective in shallow water as in deep, whereas most of the other types are unreliable in water less than 25 feet in depth. The mooring arrangement is so well designed that it is practically impossible for the mine to break loose. The anchor is very heavy, and the dragging of the anchor will not release the mooring cable. By the use of the tripping cable mines can be raised with perfect safety. When in position they cannot be displaced or exploded by the action of the waves or by countermining. As the mooring cable reel is attached to the mine instead of to the anchor, more time is available for the automatic submergence device to come into operation, and its efficiency is thus increased. The working of the device is not affected by the speed of the mine-laying vessel or by the condition of the sea surface. The electrical features of the mine resemble those of the Russian type, from which it was evolved. In the Russian mine the contact horn, or finger, is composed of a glass tube, containing a chlorate of potash mixture, enclosed in a lead tube, over which is screwed a brass safety cylinder. Before the mine is planted this cylinder is removed. Inside the case, and directly beneath each tube, is a thin brass cylinder closed by a piece of wood. This cylinder contains several pieces of zinc and carbon arranged in the form of a battery, the zinc and carbon wires being led through the piece of wood. The copper cylinder holds a priming charge of gunpowder and a detonating fuse, the terminals of which are connected to two insulated wires, the first of these being led to the filling hole and connected on the inside to five zinc wires. Each zinc wire is attached to one end of a safety arrangement, the other end of which is connected to five carbon wires. Before laying the mine the brass tubes are removed, leaving the lead tubes exposed. When the mine is struck with sufficient force to crush any one of the lead tubes, the chlorate of potash mixture falls upon the zinc and carbon pieces, thus making a battery, which produces a current and explodes the mine.—*The Engineer*, 14/9.

GREAT BRITAIN

FUEL OIL SUPPLY.—An ample supply of fuel oil for the British Navy was assured at a conference between British Government representatives, Standard Oil officials and members of the Shipping Board. Oil reserves in Great Britain have run so low, the conference disclosed, that many British warships have been forced to remain inactive.

To remedy this situation the Shipping Board will rush construction of 58 oil tankers recently commandeered in shipbuilding yards and is considering building 40 more. British representatives said their navy would require about 360,000 tons of oil a month, but Standard officials declared this was more than enough.

Shipping Board officials made it clear that there was little likelihood of the United States being able to furnish ships to carry oil for merchant craft.—*Washington Post,* 14/10.

AVIATOR LOSSES IN CANADA DUE TO GERMAN SPY.—An astonishing story of a German spy's work right in the heart of a British military encampment in Canada—work which cost nine lives and many thousand dollars in damage—has come from a trustworthy person who has just returned from the Dominion.

Camp Borden, one of the largest training places in Canada, was the scene of the treachery. This camp has a large aviation school.

Several weeks ago a promising young pupil went aloft for a flight. His machine suddenly made a "nose dive," fell directly to earth and was smashed to bits. The pupil was instantly killed.

Scores of other pupils went up in the air. Man after man fell to his death—nine being killed. Every machine in the hangars was subjected to a minute examination. In each case where a machine had fallen the control wires had been filed down close to the breaking point at a place where the filing would not be noticed in an ordinary looking over of the machine before its flight.

Several days later Canadian secret service men caught the traitor. He was a German-born Canadian.

He was taken away from Camp Borden by an armed guard to a fate which had not been revealed when the narrator of this story departed from Canada.—*Washington Post,* 21/9.

ROYAL NAVAL COLLEGE, OSBORNE.—The future of the Royal Naval College at Osborne is again under discussion, as it has been many times since the establishment was opened by King Edward on August 4, 1903. We do not remember that a happy augury in the date has been noticed before, one that is particularly striking, inasmuch as the personage mainly responsible for bringing the college into existence, at about the same time predicted the year, if not the month, in which war with Germany would occur. Although it had been stated in an apparently inspired announcement that the establishment would be closed shortly, this threat had been made so frequently that we are not surprised to see it falsified again. No one doubts, indeed, that the temporary buildings at Osborne have long ago served their original purpose, and, indeed, it was practically settled at one time that the institution should be rebuilt at a cost of £200,000. The only question raised at the time concerned the choice of a locality, but there was never a doubt expressed about the necessity for giving permanence to the college for the purpose for which it was built. There are, of course, a number of more or less prejudiced people who would like to see the whole thing swept away. Among these are the preparatory schoolmasters who would not object to see the age of entry raised, in order to disestablish a formidable rival. Another and a more noisy clique is anxious to abolish Osborne because it represents an educational system whose author and all his works are to them anathema.—*The Army and Navy Gazette,* 8/9.

BRITISH LOSSES.—British casualties reported during the month of September total 104,598, divided as follows:

Killed or died of wounds—Officers, 836; men, 18,302.

Wounded or missing—Officers, 2151; men, 83,509.

The severity of the fighting in which the British have been engaged during September is indicated not only by the total casualties of more than 104,000, but by comparison with the August figures, which were 59,811. Casualties in some of the late August fighting in Flanders are naturally included in the September total, but this may well be offset by late September casualties not reported in time to be covered in the figures announced to-day. The total compares favorably, however, with the figures for September, 1916, the third month of the battle of the Somme, when the casualties were 119,549.—*N. Y. Times*, 30/9.

WOMEN WORKING IN SHIPYARDS.—The women and girls of England and Scotland are helping win the war by working as laborers in the greatest of the nation's shipbuilding plants. Elsewhere female workers perform duties which are made as light as possible for them. They drive motor cars and serve as clerks. But in the shipbuilding yards they do work that heretofore was done by strong men.

In every yard there are hundreds of them, and in one plant just visited by a staff correspondent of the Associated Press 6000 of them are employed. They are dressed in khaki trousers and belted coats which reach well above the knees. Their hair is tucked up under little round khaki caps. But they could never be mistaken for men. Nearly all of them insist upon wearing high-heeled shoes, and their tastes run to silk stockings.

These women and girls for the most part—before they started building ships—wore cotton hosiery. But now they earn their own money and, as they get the same pay for doing the work men used to do, they can afford silk. In any shop or any yard they can be seen garbed like this standing at the front of the forges, heating rivets, running electric machines and cranes; manufacturing on lathes and punches blades for turbines and doing various things to great steel plates which eventually, with others, will form the sides of ships. Their hands get dirty with grease, soot, iron stain, and other dirts of the shipyards. But their faces always seem to be spotlessly clean.

Around a gigantic machine on the banks of the Clyde the correspondent saw seven girls, none over 20, lift a heavy steel plate and, while some held it in place, one guided a punch and another swung a lever operating the punching mechanism. They were working as if their lives depended upon speed, and they worked like a well-trained team.

The machine adjoining was a high-speed saw for cutting heavy steel parts. Before this were standing two girls in high-heeled shoes, silk stockings, and khaki suits. Both had on goggles to protect their eyes from the shower of shooting sparks from the steel saw. Their caps were pulled well down over their ears. They, too, were working hard, and seemed to like it. After working for four or five minutes the steel part had been sawed up into the proper lengths. Then the saw was stopped and the girl who had been doing the actual sawing flicked steel dust from her jacket and proceeded to wipe perspiration from her brow with a handkerchief about the same size as one would expect to see in the hands of a shopper on Fifth Avenue. Then she hitched her trousers after the manner employed by sailors and went off to luncheon in a special little building which has been erected by the shipbuilding company for the comfort of its female employees.

"It isn't really hard work," said one of these girls, "even if it is a little different from the things we all have been doing before. I used to work in the office of a Glasgow hotel. This is rougher, of course, but then I feel that I am helping my country, and besides if I do work a little harder it doesn't hurt me, and I get more money."

Foremen and managers of many of the yards have said that they were satisfied with the work done by the female employees. At least one expressed himself as being more pleased with the work of the women and girls than he was with the men whose jobs they are filling.—*N. Y. Times*, 30/9.

THE AIR INVASIONS OF ENGLAND.—The attainment of their objectives of some of the recent enemy raiders by air not unnaturally causes the average English civilian to feel that there is a good deal lacking in the proper administration of our air defence system. At all times in history the British nation has shown a marked tendency to despise its foes. There were some who adopted that attitude after the present hostilities began; but there can now be few indeed who do not recognize that no detail must be neglected, no slackness permitted, no effort spared if we are to bring the war to a satisfactory conclusion. To the dweller in London or on the East Coast the fact that we are at war against a cunning, determined, and absolutely unscrupulous enemy is most closely brought home through the new medium of warfare—the air. The events of the last three years go to prove that the Germans are more persevering and energetic in making progress in the engines and methods of warfare than we seem to be. In the early days of the great conflict it was rather the fashion to despise Zeppelins. The incidents that led to a recognition of the possibilities of these airships were not agreeable, and it took us a fairly long time to gauge their limitations and check their ravages. But as we gained, at any rate for the time being, the mastery of that form of aircraft a greater peril arose. It is fully admitted that it is easy to find fault and we are not so foolish as to anticipate perfect immunity from an occasional lucky dash, favored by rare circumstances advantageous to the German raiders. It is on the principle that in a football match points will sometimes be scored by a team distinctly inferior to its opponents. In such a manner, for instance, the naval bombardment of Scarborough in December, 1914, which now reads like ancient history, and the slight success the other day were able to be carried out. But the air raids upon our capital city and several East Coast towns have been far too frequent to be regarded in the same light.

It may be argued that the loss of life and the damage to property, in proportion to the magnitude of the war, have up to the present been comparatively insignificant. As a matter of fact we cannot regard the figures as negligible, and even if they were much smaller than unhappily they are, the case is not really affected. The German air squadrons have repeatedly crossed the Channel, dropped powerful bombs in various places with some effect, and then succeeded in escaping practically unscathed. When we do contrive to bring down enemy aircraft it is nearly always on their return journey and after they have to some extent accomplished their task. During the week ending September 8 it was understood that out of 127 hostile machines that had reached England, a loss of only seven was admitted by Germany. Making every generous allowance for the difficulties which have to be surmounted this is not as it ought to be.

The public are asking if there is a reasonable hope of immediate improvement and of being able to punish severely any German raiders who risk future attempts. The contention by a section of the press that because the army in the fighting line is hourly exposed to what is but an occasional event to the inhabitants of London, the latter should therefore be satisfied to accept anything the Germans can inflict upon them, is not based on sound principles of reasoning. We gladly grant that the military requirements at the front have the first claim, and that the needs of the army in France must always have precedence of consideration. But, even if it be admitted that every soldier's life is worth more than that of any civilian, as a London daily asserts, it may fairly be asked, "What about the women?" to whom the term "splendid" is now invariably applied, and the children,

on whom the future of the Empire depends. In the late attack on Chatham, moreover, more than a hundred sailors of the Royal Navy were killed; and they assuredly were fighting men, and in addition an able seaman cannot be made in a day. Again, putting aside all questions of human life, the moral effect cannot be neglected. Enough success has already attended the enemy air invasions of England to render it easily possible to imagine many of the government offices in Whitehall being destroyed in a few moments, and such an occurrence would at the least throw our military and naval arrangements out of gear for some time, which would be a distinct military advantage to the Central Powers. The Houses of Parliament and Westminster Abbey are adjacent; and if their destruction would be deplored merely on grounds of sentiment, it would be at least sufficient to give good excuse for another display of flags in Berlin. Readers, also, do not need to be reminded that a royal palace is situated very near to the buildings just mentioned.

As regards the call for aeroplanes and guns in France, surely, as we have been at war for over three years and are spending many millions a day on its prosecution, it is fair to expect that there should be sufficient equipment to meet the necessities both of the actual campaigns and of home defence. Generally speaking, the public does not know who is actually responsible for the defence of London and the southeast of the country against enemy air attacks. It must also be remembered that Dunkirk, where certainly our airmen themselves are second to none, is really London's first line of defence against air raiders. Has the unnamed officer answerable for London full control over the big air force at Dunkirk? These are but a few points upon which the public is quite naturally pondering. It is not for us to fix or apportion the blame; but assuredly dwellers in our capital city ought not to be exposed to this constant and occasionally successful invasion by air. Someone is responsible, therefore someone is to blame. Truly it is not asking too much to demand that the responsibility be at once made a real responsibility. At present it does not seem to be so, and the result has been only too obvious. If, as is asserted, there are many inventions pigeon-holed at the Munitions Ministry for counteracting these raids then common sense demands that they should be tried without further delay. It ought not to be necessary to remind the officials at Princes Street that "there is a war on," and that they are paid big salaries to help to win it.—*United Service Gazette*, 13/9.

TRANSPORTATION.—There is no subject connected with the war of greater interest to all who are in the profession of arms than the transport of troops and stores by land and sea. There is no matter either in which, so far as information on the subject has been published, "hustling" methods have been more manifest or more valuable. Some day, when the full story of the transport of troops from all quarters of the globe to the fighting fronts is revealed, it will not fail to astonish large sections of the people. But only the technical reader and the student of war will be able to appraise the operation at its true worth. In February, 1915, Mr. Churchill gave some figures to the House of Commons concerning the work of the Admiralty Transport Department up to that date, and we know that these have been multiplied many times since. It is common knowledge that the Great General Staff in Germany were entirely taken by surprise when the First Expeditionary Force from this country was landed in France. Some details concerning the work of transporting that force have been made public, and they are such as to make us justifiably proud of the organization which was brought into play at that time. The whole movement was performed with marvellous secrecy and a promptitude and efficiency which could but fill the country with admiration. The successful work then carried out has on many occasions since been repeated, and as the war has gone on so has the need increased for transporting large bodies of troops and many millions of tons of stores across the seas thousands of miles in

complete security from every attack save that of the submarine. So thoroughly and effectively has this been done, and the undertaking, which seemed to present almost insuperable difficulties, successfully accomplished, that the magnitude and marvel of the feat have scarcely yet been realized by the public. The point may be raised whether for the instruction of the Allies and neutrals, as well as our own people, the time has now arrived when some official revelation of these operations and their significance should not be made. It seems necessary also that a reminder should be given that the situation at sea, and the feasibility of these achievements, has been dominated and decided entirely by the influence of the grand fleet in the North Sea, the secure foundation upon which everything else has rested. It has been the control of the sea communications made possible by the continued presence of that force in unchallenged strength and efficiency which has enabled these unexampled performances of transport to be carried out, practically without interruption or serious molestation, for the past three years. This condition of affairs we may confidently expect to enjoy and profit by in the future, and so long as the war may last.

Reference has been made to Mr. Churchill's revelations in 1915. He said in February of that year:

"We have now moved by sea at home and abroad, including the wounded brought back from the front, including Belgian wounded, including Belgian and French troops, moved here and there as circumstances required, often at the shortest possible notice, with constant changes of plan, across oceans threatened by the enemy's cruisers and across channels haunted by submarines, to and fro from India and Egypt, from Australia, New Zealand and Canada, China, South Africa, from every fortress and possession under the Crown, approximately one million men without up to the present any accident or loss of life . . . . so smoothly and unfailingly has this vast business, the like of which has not been previously witnessed, been carried through, that we have several times been compelled to remind the soldiers whom we serve that, after all, we are at war."

Mr. Churchill was referring particularly to the sea transport of troops, but the transport by rail in those early days was also performed with wonderful expedition. It was said, indeed, that there was no event in railway history to compare with what the British lines accomplished in August, 1914. The speed and accuracy with which military traffic was handled at the outbreak of the war was briefly described by Mr. H. A. Walker, the general manager of the London and South-Western Railway. He said that the railway companies were given a time limit of 60 hours to get ready for despatch to Southampton, the port of departure for the Expeditionary Force, 350 trains of about 30 vehicles each. As a matter of fact, delivery was made in about 48 hours. Every day during the first three weeks of the war, and during a period of 14 hours, no fewer than 73 of these trains were handled. The troops entrained, the cars ran to the boat side and unloaded, while in addition to the men a full equipment of guns, ammunition and horses was also carried, the trains arriving at the dockside at intervals averaging 12 minutes. Some of these trains came from Wales and others from the north of Scotland, but there was no hitch, and only by the high efficiency of the disciplined staffs of the railway lines, from the general managers downwards, under the energetic direction of the Executive Committee, could the feat have been accomplished. That all this should have been done without the enemy obtaining a knowledge of what was happening, and safe transport guaranteed, is surely high testimony to the organizing power of the shipping and railway companies, to the forethought and energy of the authorities at the time, and last, but not least, to the fleet, which gripped the enemy and prevented any attempt at interference. Surely, in a history of the world, no such striking example of the potency of naval power has ever been afforded.

During the war in South Africa it took three months to send from these shores 50,000 soldiers, 5000 horses, 50 or 60 guns and the necessary equipment for this force. In about the same number of weeks we despatched across the Channel a force of nearly double this strength in officers and men and many times the number of guns and horses, not to speak of vehicles and stores of all kinds. The transport of this army and its successors to the battlefields is another story. In recent times, however, there has been no transport achievement more successful or more significant than the conveyance of Russian troops to France last year. This undertaking, which involved a journey for the troops of just over a distance of two-thirds of the circumference of the world, was accomplished, with various stoppages, in a little over two months. So well organized and managed was the operation that it was carried through without friction and unfailingly even in the presence of the enemy submarines. Truly, then, the work of the navy and the mercantile marine, of which this is but one sample, is as deserving of recognition as that of any body or unit of the fighting services.—*Army and Navy Gazette, 22/9.*

BRITISH WORKSHOPS AND THE WAR.—In a speech delivered in the House of Commons, June 28, 1917, by Christopher Addison, then Minister of Munitions in the British Cabinet, it was stated that the program decided upon by the British Government in 1915, as regarded the production of munitions, required the erection of large additional factories in many lines. As a result of this policy, many products have been manufactured at a price considerably below that which prevailed in the market at the time of the erection of the factories. Thus the present cost of production of one of the basic high explosives, trinitrotoluol, at Queensferry, exclusive of interest and amortization, is 8½d. per lb. When the factory was started the cost in the market was 1s. 9d. per lb.

In connection with the manufacture of explosives and under an arrangement with the Food Production Department, a section of the Explosives Supply Department has been started for the provision of all the artificial fertilizers which are required. The control of the iron and steel industries gives all the basic slag that is wanted, and it is expected that the entire war problem in fertilizers will be met and give more than one million tons of superphosphates, nearly half a million tons of basic slag and a quarter million tons of sulphate of ammonia. Further, through the ingenuity of Mr. Kenneth Chance and his staff, a process has been discovered whereby great quantities of potash may be obtained sufficient to meet the requirements of the optical-glass trade and leave some surplus for the needs of agriculture.

The production of sulphuric acid has also been greatly increased. In particular, that of fuming acid is more than fifteen times greater than it was before the war and costs less to produce.

That the production of gun ammunition and fuses has been increased many times is a well-known fact. It is less well known that a new explosive component has been found and apparently thoroughly tested out.

Many of the filling and shell factories are worked by voluntary boards of management. At present the whole work of filling employs about 100,000 persons, and the cost of filling has been reduced by 40 per cent, as compared with what it was a year ago.

The inspection department has grown tremendously in the last two years, both because of the increasing magnitude of production and because of the greater diversity of the munitions supplied. In July, 1915, the staff of the inspection department consisted of 8761 persons. It now consists of nearly 40,000 persons in the United Kingdom, with an additional staff in the United States of more than 8000. An effort has been made to employ women in every possible way. In March, 1916, they composed 28 per cent of the staff. They now compose 61 per cent, numbering 29,000, and they are employed on almost all operations except those in which special technical experience or physical strength is required.

Notable improvements in design are claimed to have been made. During the battle of the Somme reports were constantly received that a considerable number of rounds of ammunition either failed to explode or burst prematurely. This has been eliminated to a considerable extent.

As regards the development in gun supply, the demand for guns for anti-aircraft purposes and for the arming of merchant ships has placed a particularly heavy strain upon the country's capacity for producing long-range guns for use in the field. At the same time the output at Enfield has increased tenfold and the weekly capacity for the production of machine guns is more than 20 times greater than it was two years ago. Some months ago the output of small-arms ammunition became so abundant that it was found unnecessary to place any orders outside of the United Kingdom. The arsenal at Woolwich has increased tremendously. In August, 1914, the staff consisted of 10,866 persons. Now it amounts to 73,571. The number of women employed in 1914 was 125. Now it is close to 25,000.

A significant instance of how the war helped allied industries is cited in the case of glass for optical instruments. Before the war England would rely on home sources for only about 10 per cent of the glass used in optical instruments, being dependent mainly on German and Austrian supplies. Since the war, however, difficult formulæ have been worked out, especially by Professor Jackson and his colleagues, and under comprehensive arrangements, England not only has adequate supplies for herself, but is able to provide substantial assistance to her allies. In fact, the whole group of industries connected with the glass trade has been placed on a secure foundation.

The great provider of the war industries, the machine-tool department, is the servant of all, and has to furnish every variety of machine from the smallest tool, or lathe, to the mightiest crane. The department has a machine-tool clearing house by which idle and insufficiently used machinery is investigated and examined and an attempt made to divert it to better use. During the past seven months (previous to June, 1917), this branch investigated 22,027 applications and succeeded in releasing 42,638 machines roughly valued at more than £3,000,000.

The "tank" made its appearance last autumn. At the close of the year much work was still required to be done in the way of alterations and improvements, but the supplies of new designs are coming forward excellently. The end of the story is not reached and constant improvements are being made.

As regards aeroplanes, it had been found that the mobilization of all resources for the production of internal-combustion engines under a unified scheme of direction was essential. Such a working relation was established. Formerly there were a number of shops which were producing a number of different types of engines. By a continued effort to diminish the number of types and to concentrate on the best, with the policy of maintaining one shop devoted to the production of only a single type of engine, an enormous increase in production has been obtained apart from the addition either of machinery or labor. The output of aeroplanes is rapidly increasing. The production for May is more than twice that of December and four times greater than that of May, 1916. The supply, however, will become much greater still in a few months' time, for the government is working at a vast problem of production and the plans provide for its full realization.

The following statements are made as regards the effect of the submarine campaign on the production of munitions. In overseas supplies alone the Ministry of Munitions is interested in nearly 1,500,000 tons of munitions monthly. Of shell components shipped from North America to supplement home production the total loss since the commencement of the unrestricted submarine campaign, taking the heaviest item of loss in any single component, is only 5.9 per cent of the amount shipped.

As regards the American and Canadian supplies, it is stated that until recently all purchases were made through J. P. Morgan & Co. Lately,

however, Mr. Gordon, the Vice-Chairman of the Imperial Munitions Board of Canada, at the request of the Minister of Munitions, has moved to the United States and has been appointed as the head of all British munitions organizations there and will report to Lord Northcliffe. Negotiations are now (June, 1917) proceeding at the suggestion of the United States Government for a further consolidation of interests on both sides.

A vigorous attempt has been made to economize in the use of metals and a part of the program was the institution of scrap collection and distribution. For this purpose an extensive salvage department has been established, which works in cooperation with the armies at the front. The Minister of Munitions proposed to reform hundreds of thousands of 18-pounder cartridge cases. When it is remembered that the price of a new case is about 7s., that it can be reformed four times, and that the process of doing it costs 4d. a case, the importance of this branch is obvious. Another committee is charged with the duty of devising ways of economizing in the use

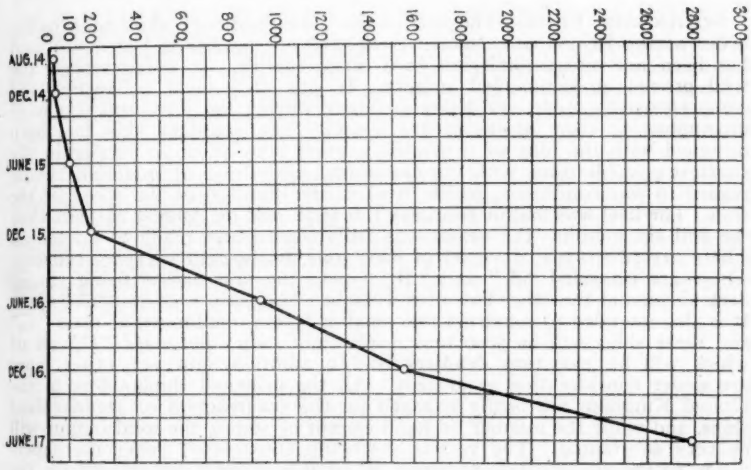


FIG. 1.—Increase in Production of British Munitions, by Weight

of the more expensive metals. In this way a reduction in the amount of copper used in copper bands is secured, amounting to a saving of many thousands of tons of copper in a year, and less expensive metals are now brought into use as constituents of various fuses and other shell compounds.

A large amount of attention is being given to the question of health of munition workers, and principles are being established which will continue to be applied long after the war. More than 600 firms have appointed supervisors whose sole duty is to promote the welfare of their workers, and great benefit has resulted in different directions. Should they be necessary, schemes have been prepared in connection with the feeding of munition workers which have regard to the arduousness of the labor in which they are engaged. Last year the problem arising out of the handling of poisonous explosives (T.N.T. in particular) became somewhat acute, and a special committee was appointed to investigate them and make reports. This resulted in the application of suggestions which have been accompanied by an enormous diminution in the cases of illness. It has been found here, as in many cases before, that the problems of prevention when understood are simpler than those of cure.

The widespread employment of women in munition work has been accomplished with singularly little difficulty. From 60 to 80 per cent of the machine work on shells, fuses and trench-warfare supplies is now being performed by women. They have been trained in aeroplane manufacture, in gun work, and in almost every other branch of ammunition work. Also a large amount of mobile labor, not previously trained, has been utilized. For this purpose training supplementary to that which goes on in the works had to be resorted to. More than sixty technical schools and colleges in Great Britain are used in this work and have trained more than 32,000 workers. There are also five special industrial factories engaged in training. Three other sections of the Ministry of Munitions have been in constant operation to supplement that which is done either by dilution or training. There are 38,000 skilled work people employed away from their homes as war-munition volunteers and also 40,000 soldiers who have been released from the colors and have placed themselves at the disposal of the Ministry.—*The Journal of the American Society of Mechanical Engineers,* October.

STANDARDIZED SHIPS.—The first of the "standardized" ships built to the order of the British Government completed her final tests last month and has been put into commission as a cargo carrier. In every respect the trial proved an unqualified success. It was of a most exhaustive and comprehensive nature, and those on board during the inaugural trip were unanimous in their praise of the vessel. The standard ship has been designed with the idea of providing a good type of cargo carrier in the shortest possible time, with the minimum expenditure of material, having regard to war conditions, which involves the question of the speed of the ship. The keel was laid in February this year, and on August 25—less than the full six months—the vessel was fully loaded and ready to go to sea. There are two types of vessel of 8000 tons deadweight carrying capacity. These are classified "A" and "B" types; the first named being single-deck ships, and the other two-deck vessels. This ship is of the "A" class. It is also intended to construct two smaller types; one known as class "C," and these ships will be 5000 tons deadweight each; and class "D," all of which will be 3000 tons deadweight. In addition, however, other types are under consideration at present. All the principal shipbuilders in the United Kingdom are busily engaged on the construction of standardized ships, and while the number on hand cannot be stated, the total output will be very substantial. The vessels are being constructed under the supervision of the classification societies, all of which are collaborating for the common cause. As in the case of the hull, the machinery and engines are all standardized, so that the first engine goes into the hull complete. This is an obvious advantage of the first degree, as not infrequently it has been the experience of builders to wait some considerable time for the installation of the machinery. Engines and machinery, of course, lend themselves more readily to standardization than the ship itself, as variations occur in the construction of the vessel owing to the different facilities in the respective yards. Special attention has been devoted to the question of speed, with a view to securing the maximum number of knots for the service in which the vessel is intended to trade. A feature of the general arrangements and equipment is provided in the very large hatchways, making the ship almost practically self-trimming and immensely facilitating the loading and discharging of the ship. In fact, the central idea is that such steamers should be not only built quickly but capable of being worked speedily. Thus the standardized ship represents a long advance on the way towards producing a poor man's ship, as it can be run on the most economical lines, everything possible having been simplified. Admittedly there are no "frills" on the standardized ship. But the essential and paramount question of efficiency has not been overlooked and, according to the knowing ones, there should not be the slightest difficulty in selling such vessels to any private owner after the war.—*Shipping,* 22/9.

GREECE

MERCHANT MARINE.—From its merchant marine Greece is estimated to have raised a net profit of 220,000,000 drachmas ($42,460,000) during 1916.—*Shipping*, 15/9.

FRENCH TO RE-ORGANIZE NEW ARMY.—A French military mission is about to arrive to cooperate with the Venizelos Government in a complete reorganization of the army, which for the last three years has been divided against itself, sometimes operating with one side in the European conflict, sometimes with the other side, and sometimes with both sides at the same time.

This condition has been due to the divided state of civil rule, with a Constantine Government at Athens and a Venizelos Government at Saloniki, one favorable to the Central Powers and the other fighting with the allied forces on the Saloniki front. Now that both governments are united under Venizelos, one of the first moves is to try to heal this division in the army, and to organize a united, well-disciplined fighting force of about 300,000 men.

The government has taken the first step in the new organization by calling out the classes of 1916 and 1917. These will give about 60,000 fighting men. The general mobilization will come later, yielding upward of 200,000, who, with the seasoned Venizelos troops, which fought at Saloniki, and the young divisions now being formed, will carry the total well above 300,000 men.

The French military mission will be headed by General Bracquet, with a personnel of 80 officers of all branches. It will be the second time in recent years that the French have organized the Greek Army. The effectiveness of the army in the Turkish and Balkan wars was due to the organization carried out by General Eydoux, a French general of brigade. It is expected that the new army will be ready by spring to cooperate with other Balkan forces.—*N. Y. Times*, 6/10.

ITALY

SUBMARINE CHASERS.—Ninety submarine chasers have been ordered by the Italian Government to be built by the Submarine Boat Corporation and the British Government has ordered 30 chasers of a similar type which are in addition to the 550 ordered by the same government a short while ago from the same firm. The United States Government has placed orders with the corporation for 16 motor boats.—*Army and Navy Journal*, 29/9.

T. N. T. ORDER PLACED IN THE UNITED STATES.—The $15,000,000 plant of the Federal Dyestuff and Chemical Corporation, for which a receiver was appointed recently, will continue to be operated under a contract with the Italian Government to furnish $2,000,000 of trinitrotoluol. The Kingsport plant has a daily capacity of 10,000 pounds of "T. N. T.," as the explosive is commonly known. The litigation tied up raw material valued at more than $1,000,000, but it is said that bond has since been given in order to continue operations. The plant employs 800 men.—*Washington Post*, 13/10.

GUNS MOUNTED ON RAFTS.—Recent dispatches from the war front reveal that in the offensive against Austria the Italian and British navies are employing with great success a new weapon in the form of "floats" or "rafts," on which big guns are mounted.

Now it is discovered that a Boston man, Theophile Schneider, of the Back Bay and Dedham, submitted a plan for a "non-sinkable" light-draft "float" to the British Government early in the spring of this year.

Mr. Schneider's plan was "turned down" by the British Admiralty when he placed it in their hands. Their reply was that the idea was "impracticable."

Ever since the loss of the English and French battleships in the Dardanelles attack he has given serious thought to the development of such a raft. Mr. Schneider says:

"Since the advent of the *Merrimac* and the *Monitor* the main development of major fighting craft has been along the lines of ever-increasing defensive armor and ever-increasing size of guns with greater penetration. Inevitably the advance of one factor brought about an increase of the other.

"Consequently, battleships grew even larger to bear the weight of armor and larger still to carry the guns which were capable of penetrating. The eventual development seems bounded only by the physical limits of practical construction.

"The battleships, or dreadnoughts, had within themselves two great defects, ever increasing with their increasing size: the weight of armor above the water-line—a protection so long as the ship was intact but a menace as soon as the buoyancy became affected through injury to the ship; and the magazines. Even though placed within the most protected parts, they were still vulnerable and a single explosion might be sufficient to destroy the vessel.

"The introduction of mines and submarines showed a third inherent defect; the necessary deep draft, which exposed them freely to enemy torpedoes and contact mines.

"The great development of mines, and especially of the submarine, very soon showed the danger, the apparent impossibility of using the dreadnought type of vessel, the backbone of every navy, in coastal waters and coastal attacks. Enemy shores protected by mines could not be reached; waters infested by submarines had to be avoided; a coast blockade in the old sense was soon shown to be impossible.

"Not even England, with its powerful navy, with the navies of France and Italy, yes, of Japan and now the United States, dared risk the dreadnoughts—the very vessels they would have to depend on in case of a desperate dash of the Germany Navy.

"The events of the Dardanelles proved too clearly the danger. The German bases have been practically immune from sea attack and the rats are still in their holes.

"But the problem, looked on from another angle, seems simple enough. It is confused because we think of ships only in terms of ships.

"For coast defence and for attack in coastal waters a ship, in the last analysis, is simply a protected gun platform.

"Substitute the idea of a 'gun platform' for the idea of a 'ship' and it at once seems feasible to work out the problem from this direction. If such platforms can be built large enough to carry the largest types of guns, buoyant enough to support them and so constructed that it would take considerably more than a single explosion of torpedo or mine to destroy it, the problem would seem solved.

"The closed cylinder probably is the most buoyant form of unit. A number of such units, fastened together in whatever lengths desired or necessary, would be non-sinkable through the destruction of one or more of the units, for the remainder would be sufficient to keep it afloat. A number of these lengths, placed parallel with one another, would form a platform of tremendous buoyancy and would be unsinkable, in a practical sense, because only sections of the outer lengths would be destroyed. The inner ones would be entirely protected by the outer ones.

"And the inner ones would contain the magazines, oil tanks, necessary machinery, etc.

"Mounted on these platforms, or 'rafts,' would be a turret housing the largest type of guns, with such auxiliary rapid-fire guns, and anti-aircraft guns and smaller calibers as would be needed.

"It would even seem possible to make such a type wholly or practically submersible through the filling of a number of the compartments with water. The same device would insure or restore equilibrium in case of the destruction of one or more cylinders on one side. Then an equal number of cylinders could be filled on the other side.

"It should be said here that these rafts, or gun platforms, are not meant to—and never could—replace the cruiser or the dreadnought. Their use would be limited to coast and harbor defence and to attacking in coastal waters."

Mr. Schneider believes that a successful attack can be made against the German submarine bases by the primary use of the gun "rafts."

Nearly all experts agree that an offensive on the part of the large battleships against the German base is too impracticable to attempt; they agree that only light draft vessels could escape the mines and get anywhere near their objective. And these light vessels, such as torpedo-boats and destroyers, carry guns too light to attain success.

The rafts could be used to cover landing parties successfully where landing parties are impossible at present.

By making a circle of them about Helgoland Island, operating against the submarine base there, he believes highly effective work against the submarines may be accomplished.

It would work in this way: The guns of the rafts—just out of range of the German guns—would compel the submarine to submerge at once upon starting out, and it would be compelled to remain submerged until out of range again outside the "ring" of rafts. Since the time a submarine can stay under water is well known the point at which the undersea boats would have to come up could be well charted out and vessels could be waiting for them when they arose.

Mr. Schneider does not attempt to outline all the technical details for the construction of craft of this type. This, he believes, should be left to the naval engineers and constructors.

But the "big idea" is his own and, together with it, he furnishes certain basic ideas of construction. He believes that the cylinder compartments of the raft would be from 20 to 30 feet in length, possibly more, and that there would be perhaps as many as 40 or 50 of the cylinders in a single raft.

The rafts themselves would be sizable affairs, a matter of 200 or 300 feet in length. They could be fitted to travel slowly under their own power if deemed desirable.

Under the cover of the large gun or guns, mine-laying, mine-sweeping, placing of submarine nets and such work could easily be carried on.

Of course, unless a sufficient number of the rafts are placed within supporting distance of one another, concentrated fire would destroy them. But many rafts would have to be destroyed to equal the loss of a single dreadnought. And the raft is a much smaller target.

These are not all the uses to which the rafts can be put. They could be fitted to serve as temporary submarine bases also.

Mr. Schneider puts great faith in the raft construction not alone because of functions which large vessels do not have but because they can be constructed quickly and cheaply—and speed is the essence of strategy.

The Italians have been making use of similar rafts against the Austrians at Triest and Pola.—*Baltimore News*, 25/9.

JAPAN

NEW CONSTRUCTION.—Japan has under construction two of the mightiest battleships ever built. They are the *Nagato* and the *Ise*, each of which will displace 32,000 tons.

An officer of the naval office said that the new ships when completed, would hold the leadership of the Japanese Navy and will have improvements not known to other fighting ships.

The docks at the naval arsenal at Kure, where the ships are being built, are being enlarged to accommodate warships of 40,000 tons.

Besides the battleships, two cruisers, one of them 7100 tons in size and the other 3500 tons, are being built, as well as two destroyers and five submarines.

These warships are being constructed in accordance with the big war program adopted by the diet at its last session, when an appropriation of $100,000,000 was voted.

A continuation of the empire's naval expansion will be under way for the next seven years and when the diet convenes in December it is expected that new provisions will be made for the increase of the fleet.—*Washington Post,* 1/10.

ALLIES URGE THE SENDING OF TROOPS.—A Tokyo dispatch, dated October 12, said:

"The Allies are insisting on Japan's participation in the war with men and fighting ships, according to the military writer of the newspaper *Nichi Nichi.*

"The American embargo on steel, he asserted, was adopted for the specific purpose of backing up the Allies' demand for Japanese troops and greater Japanese naval participation. The writer declared that after the fall of Riga the Entente Allies asked that Japan send an expedition to Europe. In reply, Japan explained that mobilization was impracticable.

"The writer expressed the belief that the Allies' demands would become more and more insistent from now on."—*Washington Post,* 13/10.

SAILORS IN THE MERCHANT MARINE.—Japan's abnormal shipping boom has largely increased the number of native sailors engaged in mercantile commerce. At the end of August, 34,329 men, including only 351 foreigners, were so employed—an increase of 2000 over the same date last year. Most of the foreigners are Chinese, serving as stewards, cooks and waiters. The following table shows the number of seamen in Japan's mercantile marine, and Japan's growth as a sailor nation:

Years.	Japanese.	Foreigners.	Total.
1881	1,901	325	2,226
1897	7,044	938	7,982
1905	20,750	352	21,102
1912	26,140	351	26,492
1914	30,083	351	30,434
1915	31,766	350	32,116
1917	33,976	351	34,329

—*The Nautical Gazette,* 11/10.

SHIPBUILDING ACTIVITY.—We are so far away from Japan that we can scarcely appreciate the tremendous expansion in the shipbuilding industry of that enterprising nation, despite the handicap imposed by her shortage of the class of steel required for vessel construction. This handicap, however, is offset to some extent by a surplus of free labor, the absence of labor difficulties, and the use of labor-saving machinery. Only recently the Kawasaki Dockyard Company of Kobe performed the astonishing feat of launching a 9000-ton steamer, with engines on board, in 2 months and 27 days after the keel had been laid. Such a record might well inspire our American shipbuilders who are about to embark upon the construction of fabricated vessels in large numbers. At all events, they must realize that Japan's shipbuilding industry is no longer insignificant, as it was before the war, and that hereafter it will be a force with which all maritime nations must reckon.—*The Nautical Gazette,* 20/9.

Three ships, representing an aggregate of 19,353 tons, were launched at Japanese shipbuilding yards during September. During August 26 vessels,

each exceeding 1000 tons and aggregating 109,621 tons, were launched at Japanese yards. If Japan succeeds in obtaining the necessary steel from the United States, the advices say, merchantmen of a total tonnage of 180,000 tons will be built in Japan within the next six months, beginning October.—*Shipping*, 13/30.

UNABLE TO SEND MORE SHIPS TO THE ATLANTIC.—A Japanese diplomat in the United States, on September 26, said:

"It is not generally appreciated in America that Japan feels she is already doing her share in the war, and that she is furnishing her full quota of ships. One-third of Japan's total ocean-going tonnage is now in European waters. This amounts to 300,000 tons being devoted practically to war uses in European waters, and represents about all Japan can do. It is hardly seen by us how more ships could be supplied for war service.

"In the conversations here the friendliest sentiments were exchanged. The discussions were limited to cooperation in the war. Of course, territorial questions, etc., did not arise. The special embassy could not take the shipping and exchange of commodities questions out of the hands of the permanent embassy here, and Ambassador Sato will continue the negotiations.

"After all, Japan is a small country, her resources are not large, her industrial equipment is not extensive when compared with America's, and, in fact, when the comparison is made they dwindle down; but we are doing our best. Japan is still suffering from the financial burden of the Russo-Japanese war. That entire war was fought out at less than one day's expenses of the present war, and it amazes us to see your Congress appropriating billions of dollars for purposes, such resources as you possess appearing almost unbelievable. Our national debt of 150,000,000 yen, from the Russo-Japanese war, is a burden to us.

"Japanese business concerns are suffering greatly from the scarcity of ships to transport commodities between the Americas and Japan. The Japanese people in Hawaii, the United States and South America have been accustomed all their lives to certain articles of food which are not grown in this country, and which it is impossible for them to get from any country except Japan. They are suffering real hardships of deprivation.

"In spite of all this, we are using a third of our ocean-going tonnage in the service of the European trade with Entente countries. In this service we have lost three of our best and finest steamships, which were torpedoed and sunk by submarines near the British coast. Besides, we have lost a number of smaller vessels off the Spanish coast and near the French coast in the Mediterranean.

"All our largest ships except two are employed in the European trade, two being routed between Yokohama and San Francisco. In addition we are caring for the peace-time trade of England as best we can in the Indian Ocean and in the Pacific, between India, Australia and Britain's other possessions, as well as China. It ought not to be forgotten, either, that Japan has been the carrier for Russia between the United States and Vladivostok. We have transported arms, ammunition and materials for Russia.

"Japan will continue her services to the Allies to the very best of her ability. But it is not probable that we can supply any material increase of ships.

"Japanese industries are suffering from a great shortage of steel plates, especially her shipbuilding industry. We are dependent now upon the United States for steel. Formerly we obtained steel from England, but that source has long been cut off, and we became dependent upon the United States. That supply, too, has now been cut off, owing to the war needs of your own country and of the Allies. Ambassador Sato will continue, also, the negotiations respecting the steel that we need."—*N. Y. Times*, 27/9.

SHIPPING PLACED UNDER GOVERNMENT CONTROL.—An imperial ordinance promulgated September 27 prohibits without permission of the government the selling, chartering or mortgaging of Japanese vessels to foreigners. The edict, which contains 13 articles, applies also to vessels building or contracted for. To the Minister of Communications is given control over steamship routes, passengers and cargo and rates and also authority to commandeer shipping yards and material. The decree became effective October 1.—*N. Y. Herald*, 2/10.

SHIPS LEASED.—Word reached Washington from Tokio October 3 that the Mitzui Bishi Company of Japan had entered into a contract with the Chinese concern in charge of the 14 German and Austrian steamers seized in China for the chartering of these vessels. The contract was signed on August 27. It is understood that the steamers will be used by several Japanese and some foreign concerns.—*N. Y. Times*, 4/10.

OLD STEEL RAILS PURCHASED IN UNITED STATES.—Large quantities of old steel rails have been purchased in the northwest by Japanese brokers and shipped to Japan. Twenty-three hundred tons of old rails have been shipped from Seattle in the last few weeks, and additional shipments are being assembled. Brokers are paying $70 a ton for the rails, which originally cost $24 a ton. In turn they are selling them to the Japanese railroads for $100 a ton.—*Shipping*, 22/9.

JAPAN AND THE WAR.—Until the present time there has been a great deal of secrecy concerning the part which Japan has taken in the war, and there has been a disposition in some quarters to believe that our eastern ally has not rendered her European allies the full cooperation which might have been expected. There are good grounds for asserting that any such criticism is based on a misunderstanding of the facts. The entry of America into the alliance has had the effect of modifying the reserve which has been maintained as to many phases of the operations in progress, and a statement as to the actual part taken by Japan has been made coincident with the arrival in Washington of the Japanese Mission to the United States. It is the fact, however, that military reasons have made it necessary to refrain from making public until now the work of the Japanese Navy, and it will, doubtless, be a surprise to many to learn the extensive naval operations which have been undertaken by Japan. At the outset of war Japanese warships operated between the Yellow Sea and the northern part of the Eastern Sea, while other ships took up their station outside Tsing-Tau. In close cooperation with the British fleet, Japanese warships patrolled the Indian Ocean and the Bay of Bengal, and at times Japanese cruisers, notably in connection with the hunt for the *Emden*, operated in the northern Pacific. When troops from the overseas dominions commenced to flow into the European battle-field, Japanese destroyers and cruisers undertook to patrol the Pacific trade routes, leaving British warships free to escort troopships from Australia and New Zealand.—*The Engineer*, 21/9.

THE NETHERLANDS

ORDER FOR SUBMARINES CANCELLED.—The semi-official news agency states that, as the American Government in the present circumstances is not permitting the construction of the submarines ordered for the Dutch colonial navy, the Dutch Government has withdrawn the appropriation therefor, while efforts are being made to have them constructed elsewhere abroad.—*N. Y. Herald*, 6/10.

EXPORTS TO HOLLAND.—The U. S. Government has refused to recognize as equitable an agreement entered into between Holland and Germany fixing the percentage of exports from the Netherlands which shall go to the Central Powers and to the nations aligned against the Germans in the world war.

It can be stated authoritatively that no American commodities, including foods, cattle fodder and dairy products will be permitted to enter Holland, or for that matter any of the northern neutral nations of Europe, while fats are being shipped into Germany on the present basis.

An authentic translation of the negotiations which were made the basis of the German-Dutch agreement, shows that in order to obtain coal from Germany, Holland was called upon to furnish

At least 75 per cent of the total exports of butter.

At least 66⅔ per cent of the total exports of export cheese.

At least as much pig meat and sausage as was exported to other countries, including exports for the relief of sufferers in Belgium.

At least the same amount of live cattle or meats as was exported to other countries.

At least 75 per cent of the total exports of vegetables.

At least 75 per cent of the total exports of fruit and marmalade.

At least 75 per cent of the total exports of fresh and preserved chickens' and ducks' eggs.

At least half the total exports of flax.

This compact has been generally accepted as an illuminating example of the situation which existed while Germany, practically cut off from the world except for the aid that the European neutrals might give, was negotiating not only with Holland, but with the other neutrals, for the kinds of food—principally fats—which were as vital to the maintenance of her armies as guns, ammunition and high explosives.

It has been stated that enough fats were being shipped into Germany by the northern neutrals to supply the entire army on the western front. The U. S. Government has made as careful a survey as possible up to this time and has come to the conclusion that fats were being exported into Germany by neutrals in alarmingly large shipments, to which America could not contribute, even indirectly. A further survey is contemplated and experts have been sent abroad in large numbers for that purpose.—*Shipping*, 6/10.

DUTCH LINE AGREES WITH EXPORT BOARD.—The Nederland Steamship Company announces that it has acquiesced to the American conditions for granting bunkering facilities, which provide that the company's vessels for every voyage between Java and the United States shall make a return voyage with cargoes exclusively American or partly Canadian.—*N. Y. Times*, 10/10.

GREAT BRITAIN STOPS CABLE BUSINESS.—Great Britain has stopped all business cable communication with Holland until such time as the Netherlands Government places an absolute restriction on the transit of sand, gravel and scrap metal through Holland from Germany to Belgium.—*N. Y. Herald*, 12/10.

PERU

GUARDS PLACED ABOARD GERMAN VESSELS.—The Peruvian Government September 29 received authentic information that at least two of the interned German steamships in Callao Bay intended to leave Callao September 29. Accordingly at six o'clock in the evening 100 soldiers and marines from Peruvian warships were sent aboard the German steamships.

All the German vessels, five steamships and three sailing vessels, are now under heavy guard, and searchlights of the warships are illuminating the bay.

It is rumored that the government has received intimation from Berlin of a forthcoming ultimatum. British patrol cruisers are reported to be waiting outside Callao, having received intimation of the German intentions.—*N. Y. Herald*, 1/10.

GERMANS PILFERING PARTS OF INTERNED CRAFT.—It developed October 1 that for two weeks Germans had been shipping parts of machinery of interned steamships into the interior of Peru, crippling the engines of government seized steamships. To prevent the accomplishment of further damage, it probably will be necessary to tow to the United States for repairs two steamships now at Mollendo. No official statement has been made by the government regarding these depredations.—*N. Y. Herald*, 2/10.

RUSSIA

POLITICAL UNREST.—Harold Williams forwarded the following cable message to the *New York Times* October 1:

"I spent a short time yesterday at the Democratic Conference. The Co-operatives were speaking. The great cooperative organizations of Russia are absolutely democratic. They existed before the revolution. They will exist when the flames of the revolution have died down. They do not merely organize. They do not hold all-night meetings and engage in complex theoretical disputes. They do not denounce and declaim and defy and demonstrate. They do not interfere in other people's business. They hardly ever touch politics. They simply work, and through their work they have laid the basis of a new life in the Russian villages. In Central Russia and Siberia, in the south and in the east, the provinces are studded with cooperative societies, and these societies are linked up in powerful unions, which have their center and bank in Moscow.

"In no country has cooperation been so directly and rapidly successful as in Russia. It has created a new type of enlightened and progressive peasant. It is the one solid instance of democratic achievement in Russia. These practical democrats sent their delegates to the conference with many misgivings. They did not believe in the conference. They considered that if any conference were necessary it should be national and should be called by the government. But in the end they did send their delegates, and yesterday their leaders spoke.

"I listened to Birkenheim, the most prominent and capable of the co-operative leaders. He said very sound things. He spoke bitter home truths. He said the revolution was a political and not a social revolution, and that all the fatal errors of the last few months proved this beyond doubt. He said the revolutionary democracy was incapable of governing Russia without the help of the middle class, that whatever was said or done, sooner or later, the power would come into the hands of the bourgeoisie, and that it was folly to expect anything else. He insisted that Russia must now face the consequences of all her revolutionary excesses. The workers, he said, must make up their minds to suffer hunger and cold—whereat the Left booed and snorted and jeered. The war must be carried on, he said, side by side with the allied democracies, and at this there was feeble applause from the Right.

"Altogether, it was a frank, sober, sensible speech of a practical man, and it ended in an appeal for the formation of a strong coalition government.

"But listening to the speech, and looking at the audience, I felt something like despair. The whole enterprise seemed so utterly hopeless. The applause was cold, and the protests were chilly, with a sort of dreary, empty cynicism. There was no life or spirit in the meeting. There was a creeping sensation of mental and moral slackness.

"Incredible things are happening in Russia just now. The night before an ignorant and self-satisfied sailor had boasted of the fine revolutionary

quality of the Baltic fleet. The audience cheered him. Yet there are thousands in Russia who cannot think of the Baltic fleet without bitter pain. The thought of the *Petropavlovsk* is a nightmare—the *Petropavlovsk* whose sailors a fortnight ago tied down all their officers on deck and then, because four of them, plucky, high-spirited youths, refused to sign a revolutionary manifesto, proceeded in cold blood to torture and murder them. They thrust bayonets into their cheeks, beat them with the butt ends of rifles, and tortured the boys in the presence of their bound brother officers until they died. Yet the sailor who boasted of the Baltic fleet was cheered at the conference. It is true that some one proposed that the conference should rise out of respect to the memory of these victims of lynch law, and that the conference did so, but where was the real horror, the flaming indignation?

"Reckless demagogy is bearing its bitter fruit, and those who sowed the seed are now using hackneyed phrases about 'saving Russia.' The very Bolsheviks are beginning to talk of the need for national defence. I looked again at the apathetic faces of the audience and felt as though I were looking at the dying embers of the revolution. Those two young soldiers in front of me with their stupid, heavy faces—what notion had they of statesmanship? And that young officer with flabby cheeks and silly, empty eyes who ostentatiously read Lenine's paper while the cooperators were speaking—how was he saving Russia? What are the Germans doing while these men are playing with politics?

"I went away with a feeling of intense depression. I suppose the conference will in the end pass some kind of resolution. It will say on the one hand this and on the other hand that, and in view of this and in view of that, and notwithstanding this and notwithstanding that, it is necessary to form a coalition government with certain provisos and with certain guarantees, and possibly even the Cadets will be admitted to the government if they promise to be good.

"But after all it matters little what resolutions are passed. The fate of Russia is not to be decided here. Other forces are at work—real, stern, inexorable—which are guiding Russia to what destinies who, in this bitter and tragical time, can foresee or foretell?"

SPAIN

SUBMARINES.—Three submarines which Spain ordered in Italy before Italy entered the war and which recently were completed have arrived at Tarragona from Genoa. It is stated that six more submarines are under construction, which will raise the total of the Spanish submarine fleet to 10. Up to this time the *Isaac Peral*, constructed in the United States, was the only submarine Spain possessed.—*Shipping*, 15/9.

UNITED STATES

NEW CONSTRUCTION.—The American Navy's war construction program consists of 787 vessels, including all types from superdreadnoughts to submarine chasers.

In making this announcement Secretary Daniels says some of the vessels have been completed within the last few weeks and are now in service and that the remainder of the program is being rushed. The total cost is estimated at $1,150,400,000.

Many of the vessels are destroyers and arrangements have been made for carrying out the $350,000,000 supplemental destroyer program, which the navy expects to be completed in 18 months.

The companies awarded the contracts are New York Shipbuilding Corporation, the Cramp Company, the Newport News Shipbuilding and Dry Dock Company, the Fore River Shipbuilding Corporation, the Bath Iron Works and the Union Iron Works. All these companies have had experience in destroyer building.

The Fore River Company, Mr. Daniels said, was the only one that had offered to build more vessels than were awarded it. Each, except the Fore River Company, was given all the work it estimated it could undertake, and the remainder of the order, details of which still are withheld, went to the Fore River Company.

Secretary Daniels said he expected the first of the new destroyers to be commissioned within nine months. They will be unsurpassed by any destroyers in the world.

"Thousands of men will be required to man these destroyers," the secretary's statement said, "and we are now busy training them. By the time the vessels are completed, the crews will be ready."—*Army and Navy Register,* 13/10.

NAVAL PROGRAM FAR ADVANCED.—Official information upon the progress being made upon the navy's construction program shows that deliveries of important units of the new flotillas will be made in from eight to ten months earlier than would have been considered possible in ante bellum days. Since the Department has made no secret of its efforts to rush the work on smaller auxiliary craft, such as destroyers, the greatest progress naturally is reported from the yards having these contracts. It is stated on excellent authority that within the next 18 months the United States will have in service the greatest number of destroyers in any navy. To appreciate fully what has been accomplished it need only be said that every destroyer now under construction is to be delivered to the government by the end of January, 1918. The success attained by the Navy Department should be attributed equally to the extraordinary powers given the President in connection with the naval plans, the hearty cooperation of the American shipbuilders and the efficient supervision of the Department.

Reports have been made to the Department upon the recent trials of one of the "flush-deck" destroyers. It is not permitted to publish the results further than to say the officers in charge were most enthusiastic in their praise of this new type. These boats, with few exceptions, are to develop not less than 35 knots.

That we shall soon have a large destroyer fleet ready to operate against the enemy's submarines is cheering news. Experiences in the present war have amply demonstrated that the destroyer and the swift armored cruiser have performed splendid service in all seas and in all weathers, and there are no classes of ships that have filled their allotted rôle better. Against submarines there is nothing so effective as fast, heavily armed destroyers and those soon to be added to our navy will have the advantage in speed, gun power and seagoing qualities, over anything we have afloat of this class. These qualities coupled with a large cruising radius will insure their effectiveness as submarine hunters and will further increase the safety of vessels under convoy. With an ample convoy of destroyers the submarine will find it much more difficult to attack, and with the large increase of the destroyer class in both the United States and British navies the submarine menace should be considerably checked. Precision in gunnery has marked the work of British destroyers particularly, and will surely mark the work of our own when opportunity offers. U-boats will hardly be inclined to take too many chances. The work of the destroyers in the winter time is specially arduous. Tossed by the great seas about the British coasts and elsewhere, their decks are almost constantly under water. The system of reliefs now in vogue, however, lessens the strain on officers and men to a great extent and, it is expected, our new boats will be more comfortable.—*Army and Navy Journal,* 6/10.

RAISE U. S. SUBMARINE.—The Navy Department has made the following announcement:

The United States submarine which sank at her dock at an Atlantic port Friday morning, September 14, 1917, has been raised. The cause of the accident has not yet been determined.—*Army and Navy Register,* 22/9.

NEW NAVAL HOSPITAL SHIPS.—Upon the recommendation of Surgeon General Braisted, the Secretary of the Navy has authorized the acquisition of the merchant liners *Saratoga* and *Havana* for use as naval hospital ships, and instructions have been given that these vessels shall be specially fitted out for their important function, the work being done at one of the navy yards. Each vessel will have a capacity of about 300 beds. The decks will be partitioned off and equipped for use as operating rooms, sterilizing rooms, diet kitchens, X-ray room, laboratory and a complete outfit for the care of the sick and wounded at sea. These vessels will be of the greatest importance in the plan of the naval surgeons in caring for those who need treatment on the way to the hospitals on land. The present hospital ship, the *Solace*, is, of course, utterly inadequate for the demands upon such a vessel. The specially designed hospital ship authorized by Congress, and under construction at the Philadelphia navy yard, will not be completed for some time, inasmuch as work at that yard is mainly applied in other directions of greater military value. The vessel is still officially known as "hospital ship No. 1," no name having yet been selected. The naval medical officers appreciate that it would be difficult to get a more suitable name than that of *Solace*, but among the suggestions advanced are "Hygeia" and "Comfort," as indicative of the functions of the vessel. Another suggestion is that the ship be named after Surgeon General Barton, who was the first head of the naval medical corps.—*Army and Navy Register*, 6/10.

TRANSPORTS UNDER THE NAVY.—An arrangement has been made between the Secretary of the Navy and the Secretary of War in regard to the vessels now chartered by the army for use as transports to be commissioned in the navy with a complete naval personnel. It has been decided that responsibility for the care and upkeep of the chartered vessels and their equipment shall rest with the navy. The cost of all charters, equipment, alterations, unkeep, fuel and ship stores necessary to the efficient use of the vessel in the transport service will be paid by the navy for the account of the army. The cost of maintenance of the naval personnel will be paid by the navy. The army equipment now on the vessels will be transferred to the navy during the continuance of the vessel in the transport service. The army will determine the duration of the charter and will, on the expiration of the charter, take custody of all government equipment on each vessel that has been covered by a transfer of funds, the navy invoicing the same to the army without transfer of funds. The quartermaster's department of the army and the bureau of supplies and accounts of the navy will jointly arrange all financial details, including conditions of charters. Arrangements have been made for the charter of 16 ships for three months, 14 ships for six months, 10 ships for 9 months, and 60 ships for a full year, the requirements made in the early part of the year by these several groups of ships to be provided for as the vessels were let out by the interned ships entering the service as fast as refitted. It is estimated that the cost of wages, crew, and operating expense of the ships will be $50,000,000. Sixteen ex-German vessels have been turned over to the Navy Department to be fitted out and operated by the navy as troop transports for the army.—*Army and Navy Register*, 22/9.

THE U. S. COAST GUARD.—So great has been the demand for an opportunity to enlist in the U. S. Coast Guard, and from the most desirable class of applicants, that only about 10 per cent of those who would like to enlist can be accommodated. The coast guard is an extremely popular service with men who like constant action at sea in all winds and weathers; this they know they will find, as enlistments are confined to men who are and who desire to be thorough seamen, in all that that implies. The service has the well-earned reputation of having seamen second to none. The very nature of the rescue and patrol work, no matter how bad the storm, demands that only men of nerve and skill be selected.

The coast guard now operates as a part of the navy, and is doing work in searching for submarines, convoying, etc. Its authorized enlisted strength before the war was 3945, and this has now been increased to 6000. Of some 7600 registered applications for enlistment between January 1 and September 22 of this year, only about 700 were accepted. Among the applicants were men from the foremost colleges in the United States, as well as men who had chiefly a practical knowledge of the sea. Some of the college men were enlisted and sent to the Coast Guard Academy at New London for instruction, and have shown great aptitude. They were warned of the rough life ahead of them before enlisting.

One reason for the great popularity of the coast guard is that its men enjoy certain important benefits not provided for the men of the other services. This insures such numerous applications for enlistment from skilled seamen and others, that the recruiting officers have the cream of men to pick from. Men enlist in the coast guard only for one year and at the end of that time can re-enlist. This brief term is a very popular one and is not allowed in the other services. Fully 90 per cent of the men re-enlist, however, so vacancies are comparatively few. The new men receive higher pay than in the navy—a seaman getting approximately $38 a month on first enlistment. They have a retirement law similar to that of the navy, but in addition if a man in the coast guard, five minutes after enlistment should be injured, even in crossing the street, so as to incapacitate him for service, he is automatically pensioned on three-quarters of his pay for life. This law was submitted to Congress by officers of the coast guard and was urgently pressed by them in justice to their men. If an enlisted man in the coast guard dies while in the service, his next of kin receives two years' pay. Men of the coast guard must toe the mark strictly, and any man who shows vicious habits is promptly discharged.

Coast Guard Vessels Oversea.—The Navy Department has received official reports of the safe arrival in European waters of a number of cutters of the U. S. Coast Guard which were detached from patrol duty in American waters to assist in the work being done by the allied fleets and the destroyer flotilla under Vice Admiral William S. Sims, U. S. Navy. The censorship rules prohibit mention of the number of boats already sent. It may be stated, however, that their duties will be in connection with the numerous craft engaged in mine sweeping. Recent accessions to the ranks of American craft engaged in this work are not confined to the few cutters. The government some time ago began quietly to commandeer dozens of fishing craft of the type that is common along the Atlantic coast and which because of their unique construction are splendidly adapted to mine sweeping. These were sent over at the same time as the cutters.—*Army and Navy Journal*, 6/10.

ORDNANCE AND GUNNERY

NAVAL ORDNANCE OUTPUT.—It is proposed to immediately increase the ordnance output at the Washington Navy Yard. The Navy Department finds it increasingly difficult to place contracts for ordnance material, guns, mounts, torpedoes and torpedo-tubes. It is also found very difficult to place satisfactory contracts for castings and forgings for the fabrication of this material. Practically all of the ordnance of the navy is designed at the Washington Navy Yard, and a considerable portion of it is manufactured there. A very considerable organization has been built up that has proven efficient in the manufacture of ordnance material, and it is believed the simplest and quickest way to meet the increased demand would be to expand the existing institution.—*Army and Navy Register*, 22/9.

FEEDING THE AIRMAN'S MACHINE GUN.—One of the thousand and one problems involved in the design and construction of a battleplane is the feed for the machine guns. When the usual type of machine gun is used,

the cartridge belt must be handled so that it will not warp and twist or in any other manner cause the gun to become inoperative at the height of an aerial engagement. With the battleplane flying at all angles and even upside down, the difficulty of maintaining a uniform, reliable feed is at once obvious. Indeed, it is the sure feed of its disk magazines that has made the Lewis gun so popular among airmen, outside of its light weight.

Recently the designers of battleplanes introduced a reel method of feeding a machine gun. In the accompanying illustration appears a typical case, and it will be noted that the regulation belt with its cartridges is held on a reel at one side of the gun. In some cases the empty canvas belt is collected in a suitable receptacle at the other side of the gun, while in others a spring-operated reel is employed to take up the belt, so that there is no chance for warped, twisted or entangled belts.

In some of the German fighting machines, particularly the single seaters, the ammunition belts feed out of one magazine situated beneath the gun, into the gun and out at the other side into a second magazine, so that only

FED FROM A REEL MOUNTED ON THE MACHINE GUN, THE CARTRIDGE BELT OF THIS AIRMAN CANNOT TWIST OR BECOME ENTANGLED

a short section of belt is at any time exposed. The spent cartridges are also collected, because of the metal which they contain. An elaborate system of feeding and collecting is employed in the twin-gun types of German fighting planes, where two belts are fed at one time and collected again. The magazines, which are built into the engine hood, are readily accessible.—*Scientific American*, 13/9.

AUTOMATIC MACHINE GUN EQUIPMENT.—All branches of the army and navy having use for machine guns have adopted the Lewis light type as part of their equipment. This includes the mobile army, the navy, the marine corps, coast guard, and the aviation branches of the army and navy. The army ground and flying schools are the latest to adopt this gun and in their anxiety to begin instruction with them have made arrangements with the Savage Arms Company for the purchase of several hundred Lewis guns chambered to fire British ammunition. These guns were the surplus product in the manufacture of some 10,000 guns for the

British Government under a contract completed the early part of this year. The guns will be used entirely for instructional purposes and later on will be replaced with guns chambered to fire United States ammunition. The urgent deficiency bill carries an appropriation for machine guns for the army of $220,277,000 and authority to contract to the extent of $110,020,000 in addition. This is in addition to the sum of $70,900,000 carried in the army appropriation act for the present fiscal year for the purchase of machine guns and funds available for such purchase in the Navy Department.—*Army and Navy Register, 22/9.*

SMOKE BOXES.—Unless some new outbreak of submarine activity develops many officials are satisfied that the situation is fairly well under control. Encouraging results have been obtained through convoying of fleets of merchant craft, the loss having been reduced to less than one-half of 1 per cent. The employment of smoke screens, kite balloons and other detection devices also has shown good results, and progress is being made with reduction of smoke from merchantmen and by painting ships to make them almost invisible at a distance through a periscope.

In discussing submarine conditions, September 22, Admiral Benson, Chief of Naval Operations and Acting Secretary in the absence of Secretary Daniels, indicated the Department's purpose to make known more of its accomplishments hereafter than in the past. No formal announcement was made, however.

Admiral Benson said the Department had been unable to find any support for reports that German submarines either had begun operations off the American coast or were preparing to do so. The Department, however, is ready for any emergency and is tracing every report from incoming merchant craft that submarines have been sighted. Amusing results have sometimes followed investigation of these reports, most of which apparently have been founded on sounds of gun fire from merchantmen and warships at target practice off the coast.

The "smoke" box, a device to be thrown overboard from a vessel when a submarine appears, has proved highly successful in some cases. A great smoke rises instantly when the chemicals in the box come in contact with the water, and under the screen created the vessel has opportunity to change her course, and elude the U-boat.

Experimenting continues with many other devices. Thomas A. Edison is still at work on investigation to which he devoted himself at the outbreak of the war. Even without the discovery of any new implement for use against the U-boats, however, the diminishing rate of destruction of merchant craft impresses many officials as showing that the submarine menace can be held in check sufficiently to make certain the ultimate defeat of Germany.—*N. Y. Times, 23/9.*

AMERICAN ARMED MERCHANTMEN.—The Navy Department has been able to find guns and crews for every American merchant vessel designated for armament. There are from 16 to 32 members in the armed naval guards on each armed American merchant ship. When the work of finding guns for these ships was undertaken the navy had few available. In order to find men for the guns on merchant ships it became necessary to turn every warship into a gunnery school to train men for the work.—*Shipping, 6/10.*

RIFLE SHORTAGE DENIED.—Alarmist reports that a shortage of rifles menaces the efficiency of the United States Army and that inferior weapons are being supplied to our troops in France fail absolutely to stand the test of investigation. The charge is so serious, involving the peace of mind of every patriotic American, that no time should be lost in making the real facts known and incidentally exposing the rôle which certain interested but disappointed manufacturers have been persistently playing toward under-

mining the faith of the people in the War Department's plans to provide an adequate supply of rifles for every man who needs them.

The alleged facts as published to the delight of a certain clique which has been trying for months to discredit Brigadier General Crozier, because he upset their plans on certain contracts, are as follows:

There are not enough rifles to equip the troops which need them, the manufacturing plants are lying idle because the War Department made impossible specifications for standardized weapons of interchangeable parts, the War Department's delay and bungling have resulted in cutting off the rifle supply and broomsticks instead of rifles have had to be provided to new recruits.

The real facts, as shown by thorough investigation and supported by an official statement from Brigadier General William Crozier, chief of the Bureau of Ordnance, are as follows:

There are more than enough rifles for troops that need them, and the supply is running far ahead of the War Department's advance calculation. Every man in France who uses a rifle has at least three of the most modern type at his disposal, and there will be from three to five rifles for every additional American soldier sent to the battle front.

Brigadier General Crozier said:

"My attention has been called to published reports that there is a shortage of rifles at the cantonments and that three rifle manufacturing concerns have been idle during the summer when they might have been engaged in manufacturing rifles.

"These arms companies have not been idle, but have been making extensive preparations for turning out a rifle which would give us both a reasonable degree of interchangeability of important parts and uniform ammunition. Two of them have begun making deliveries.

"Two days ago the deliveries of these three factories and the two government ones were 1200 rifles per day. The deliveries now are more than 1300 per day, and the deliveries will progressively increase. The third company, engaged until recently on British contracts, is practically ready to begin deliveries.

"I may also say that whenever a soldier is ready to go to Europe—that is, when is trained and equipped in every other way—a modern rifle will be ready for him.

"At the outset of the war it was fully recognized and explained that we could pursue two courses—either experience a perfectly endurable delay and produce a rifle with interchangeable parts to use a standard ammunition, or produce rifles more rapidly, but without interchangeability of parts and incapable of using a uniform ammunition.

"By waiting two or three months we have not only obtained a one-ammunition rifle, but a rifle with parts which may be interchanged quickly on the battle-fields of Europe, and which may be turned out by three factories in this country.

"The Ordnance Bureau is willing to stand on this basis, inasmuch as every soldier will be supplied a rifle of that type when he starts for Europe.

"There are now at each of the cantonments 5000 rifles suitable for drilling purposes. A rifle to each man is not imperative for purposes of drill, as the companies can train at different hours. The main thing is to supply rifles when the trained men are ready to leave, and such rifles will be rapidly turned out now by three factories and two government factories, which have equipped themselves during the summer for the work, and can supply the rifles in sufficient numbers at the required time."

An official announcement made by the War Department was to the effect that the deliveries of the new rechambered Enfield rifles had begun more than a month ahead of schedule. Instead of waiting until November for the first samples of the completed rifle, Secretary of War Baker had one presented to him nearly two weeks ago. Now they are coming at the rate

of more than 1300 per day, and this is on a progressive scale so that upwards of 2000 per day will be coming in before November 1.

These rifles are all made up from interchangeable standardized parts so that any part of one fits any other rifle. The whole point of published reports was that the manufacturers had not even begun work on the parts, and this would have indeed been serious if true.

This same report, or ones very much like it, has been peddled about certain congressional circles for two or three months.

I have already found on several occasions that they traced back to a source anxious to "get Crozier." There are many reasons why certain manufacturers want to "get Crozier" and there will be many reasons why manufacturers and their friends in Congress will want to "get" any other chief of the Bureau of Ordnance of the War Department.

Contracts cannot be given to all. There must always be the successful and the unsuccessful and the day is far off when the unsuccessful will stop trying to make trouble. But in this case they are apparently forgetting that their propaganda involves the anxiety of every father and mother who have a son at the front.

Otherwise their efforts would not attract particular attention.

Roughly, the situation with respect to rifles is as follows: All the American troops in France are equipped with Springfields, which are generally regarded as superior to the British Enfields because they have an effective range of about 2800 yards as against 1600 yards.

Approximately 800,000 Springfields were available when the war broke out, and there is an ample supply for all the regulars who will need them in the near future.

The national guard will be supplied by the rechambered interchangeable standardized Enfields now being turned out much faster than necessary.

The new recruits will not be supplied at all at present, and would not be, even if the government had 1,000,000 rifles lying idle at the arsenals.

It takes more than six weeks' training before the new recruit is ready to think about a rifle at all.

The first British troops of the Kitchener army trained with sticks, although rifles were within a stone's throw of the scene on Hyde Park where they trained.

As General Crozier said there are 5000 rifles at each of the cantonments to be used for training purposes when needed. But the new men probably were given broomsticks as a matter of convenience, if the broomsticks were more handy than the rifles. The main point is that the government will have from three to five of the best rifles in the world ready for every American soldier when he comes to need it. That is the real test.—*Washington Post*, 29/9.

CARTRIDGE PRIMERS.—The following statement appeared in the *New York Times*, September 28:

"*To the Editor of The New York Times:*

"I noticed an editorial in to-day's *New York Times*, headed 'The Defective Cartridges,' in which the statement is made 'that the commandant of the Frankford Arsenal last year advised the abandonment of the defective formula in favor of that used by nearly all the private ammunition concerns in making cartridge primers.'

"While my opinion has been that the free sulphur type of primer cannot be as stable as the mercuric type of primer, or the non-mercuric primer where the sulphur is held in combination with other elements, nevertheless the officers and the employees of this arsenal thoroughly believed in the sulphur type of primer, from which they obtained admirable results. The compositions are easy to mix and safe to handle, and while sporadic cases of the formation of acid in the primer have occurred in the past it was never considered so serious as to warrant a formal recommendation from me to discontinue it. I did not, therefore, make any recommendation to abandon

the sulphur type of primer as used in the manufacture of rifle cartridges, nor did I take any steps to replace this primer until the situation was such that it was evident to those engaged in this manufacture that a change must be made. Such a change was not made without a certain amount of opposition on the part of those engaged in this manufacture, which resulted in the resignation of the foreman who mixed it and of several employees who did the loading.

"The editorial is also in error in regard to the character of the primer used by private manufacturers in this country. The free sulphur type of primer has been used by one-half of the manufacturers of rifle ammunition in this country, and two of them are strongly opposed to abandoning it, and the opposition of one of these manufacturers is based on the consideration that no other type of primer will give the same accuracy as the sulphur primer as made by him.

"GEORGE MONTGOMERY,
"Colonel, Ordnance Department, U. S. A., Commanding.
"Frankford Arsenal, Sept. 26, 1917."

USE OF THE BAYONET.—American Field Headquarters in France, September 14.—"The neck is a very convenient point for jabbing a bayonet into a Teuton," said a snappy young British sergeant major, illustrating the method with a real weapon so vigorously that a marine, a silent participant in the demonstration, stood on the tips of his toes to save himself from being impaled on the sharp point. In cool, matter-of-fact tones the teacher described the vicious fighting that is necessary in a bayonet melee, thus bringing home to the men the "fight or die" lesson.

"It is only necessary to penetrate the body 3 inches to make the thrust effective," he continued. "However, we train our men to practice lunging with all their strength. You would be surprised, sir," he added, turning to a marine officer, "to learn how much strength it takes to jab a bayonet into a man's body. Jerking one out is even harder, especially if it has gone through a bone. Then you have to blow it out by firing a cartridge from the rifle. Always carry the magazine of the rifle loaded when making a bayonet charge.

"If a German gets too close to be bayoneted swing the rifle and catch him on the chin with the stock of the gun in this way," again illustrating with the help of the marine. "If he jerks his head back reverse the rifle, suddenly catching the other side of the chin. If that fails you have the bayonet point under the chin in the most convenient place."—*Army and Navy Register*, 22/9.

RADIO

NEW STATION AT HONOLULU.—The opening of the navy's new high-power radio station in the Hawaiian Islands, the most powerful in the world, was announced September 29 by the Navy Department. The event was signalized by an exchange of messages between the station at Sayville, L. I. and the Honolulu station, a distance of approximately 5000 miles, a record for long-distance wireless communication.

With the completion of the stations now building in the Philippine Islands all American possessions will be linked by wireless. The tests made indicate that communication between Washington and the Philippines will be maintained easily with only one relay at Honolulu.

At half-past two this morning, September 29, the Hawaiian station called Sayville and transmitted a report from the commandant of the Pearl Harbor naval station, as follows:

"To Secretary of Navy, Washington:

"I have the honor to send you the first through message to Washington, D. C., from Pearl Harbor, Hawaii, radio station, and report satisfactory progress in test of plant."

The Secretary replied as follows:

"Express my gratification to the authorities of Hawaii on this momentous occasion, wherein the first exchange of radio messages is made possible between Honolulu and the Atlantic coast of the United States; also I congratulate you on the successful completion of the most powerful radio station in the world."

The Secretary's message was acknowledged at three minutes after three o'clock in the morning, 33 minutes from the time the Hawaiian station began transmission to Sayville.

The Hawaiian station is one of a chain of high-power radio stations under construction by the Navy Department. The principal stations completed to date in the chain are at Arlington, Darien, in the Canal Zone, and San Diego. The remaining stations, at Cavite, P. I.; Guam and Tutuila, will be completed in the next two months.

The outfits include three masts at each station to support the aerial, each mast being of steel and self supporting. The apparatus is of the Poulsen arc type, which is standard in stations of the high-power chain. Suitable and comfortable quarters are provided for the personnel of each station.—*N. Y. Herald*, 30/9.

ENGINEERING

REPAIRING ENEMY MERCHANTMEN.—The Navy Department has an interesting report from the naval engineers who are in charge of the work of repairing all the ships taken over by the government at the beginning of our war with Germany. A great deal of work, as will be appreciated, was necessary in this connection on account of the wanton damage wrought on the machinery of some of these vessels, notably the *Bulgaria*, *Rhein*, and *Neckar*. Cylinders and valve-chest covers were removed, and the cylinders and chests were wrecked by hammers and rams. In the boiler rooms thermit was used in at least one vessel. The principal boiler damage was caused by lighting fires in dry boilers. A casual survey might lead one to believe that destruction was thorough and beyond repair. If the directing mind believed the measures adopted would permanently disable these vessels, it failed to allow credit to American engineering ability and the patriotic attitude of our industrial establishments. The large railroads have taxed the capacity of their machines and repair shops to furnish equipment and skilled men to take care of some of this reconstruction. The actual work has been done by electric and oxy-acetylene welding and by patching. While the use of welding in the repair of cast iron is common in railroad practice, it is not well known in the marine world, and its use is considered quite a departure in marine practice and, no doubt, will be followed with considerable interest. Former practice would indicate that renewal of cylinders was necessary, with the attendant large loss of time and great expenditure of public money. On the contrary, with few exceptions, practically all cylinders have been reclaimed and will soon be in service.—*Army and Navy Register*, 22/9.

NOVELTIES IN FUELS, AND THEIR USE.—A novel method for starting and running internal combustion engines, which is the patent of F. E. Smith and Vickers, Limited, has lately been applied to automobiles, though at the moment the aircraft engine is outside the range of its application.

The fuel is a composition of various ingredients, one mixture being 41 parts potassium nitrate, 41 parts charcoal and 18 parts sulphur, with sufficient moisture to make it plastic. Not the least important feature of the scheme is that by which only partial combustion is secured in the first cylinder, the residue of energy being utilized in the second cylinder by the addition of air or oxygen, the process being repeated continuously. For starting purposes, by igniting a cartridge of the fuel a reservoir can be immediately charged with gas at high pressure, which can be used for the engine.—*Aviation*, 1/10.

BETTER FUEL FOR AEROPLANES.—Hundreds of schemes for extracting more high quality gasoline from petroleum and scores of samples of products for which the inventors claim superiority have been submitted to the federal Bureau of Mines as a result of Secretary Lane's appeal for research to develop a better fuel for airplane engines. About 30 samples have been tested by experts of the bureau and all were reported no better than ordinary high-grade gasoline. About 10 remain to be investigated. Despite the discouraging record, the bureau is glad to receive other samples or to investigate new processes in the hope that a valuable discovery may yet be made.—*Washington Star*, 12/10.

NEW MOTOR.—Representatives of the United States, British, French and Russian governments have for some time been watching the performances of a 53-foot motor boat equipped with a gasoline engine of new design invented by an American which promises to solve the problem of putting power enough in submarine chasers to make them cope in speed with the swiftest German submarines. The motor has a capacity of 400 horsepower, the highest of its type in the world, the inventor says, and in a run on the Sound yesterday it drove the boat at 41 miles an hour. On board was Commander Constantin A. de Veyher, a naval architect in the Russian Navy. Nearly every day the boat, which has an anchorage at the Larchmont Yacht Club, has taken some government representative out on a trial trip.

The inventor is C. D. Holmes, who designed the motor now widely used in the United States Life Saving Service. He started to work on the motor soon after the war began in Europe, with the aim of a design specially suited to the submarine chaser. C. B. Cottrell and Sons Company, printing press manufacturers of Westerly, R. I., with whom Mr. Holmes has been associated in the construction of the motor, will manufacture the new engines. Production of parts of the engines has already been commenced, but a representative of the company said yesterday that none of the engines would be offered for private or commercial use during the period of the war.

With this engine three times as much power can be placed in a submarine chaser in the same space, and at practically the same weight, as is possible with any engine in present use, according to the inventor, making possible a larger boat and an addition of from five to seven miles an hour in speed. At present, according to reports from Europe, the newest German submarines have a speed several miles an hour faster than submarine chasers, so that the addition of five miles in speed to the chasers would be a great advantage in the campaign against enemy submarines. Saving of space is also a prime item, as every foot available is needed for living room and ammunition. The new engine can also be adapted for airplanes and armored tanks. Its smooth operation, with absence of vibration and steadiness, were noteworthy in the run yesterday.

The engine is of the twin-six V-type, and is the first application of this design to this kind of motor. It weighs 3400 pounds, is 8 feet 4 inches long and 3 feet 10 inches in height. The test boat is equipped with two of the engines.

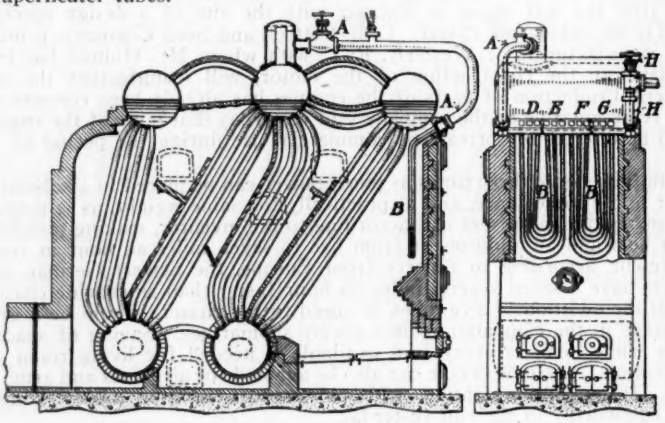
"A distinctive feature of our design," said Mr. Holmes, "is the taller crank case, which not only greatly increases the accessibility to parts, but also adds to the rigidity and strength of the mechanism. All working parts are inclosed, yet every part is accessible by covered hand holes, through which the working parts can be taken out without removing the motor from its base. The use of the twin-six design, with its practically continuous impulse, reduces vibration to a minimum.

"We have speed, but that has not been the chief aim, as there are other demands of equal importance. One is steadiness, an engine that will go all day and is not capable merely of short spurts. The need of this quality in hunting submarines is readily seen, as is also that of getting at the parts

quickly if anything goes wrong. At 1000 revolutions per minute this engine will turn off 300 horsepower, without any strain whatever, and it can be speeded up to 1400 revolutions, producing 400 horsepower, with very little evidence of extra effort. We think a 110-foot submarine chaser, the type now used by us, would make a speed of something like 25 miles an hour equipped with our engines, that is two on a shaft. We produce a horsepower to every nine pounds of engine, while the ratio of those now in use is about one to twenty."

The maximum speed of submarine chasers now in use in European waters is about 20 or 21 miles an hour, according to the figures given out by American manufacturers of the craft, while the surface speed of a submarine has been variously given as between 15 and 20 miles an hour. American-made chasers that were said to be capable of making 20 knots an hour were equipped with two gasoline engines of 250 horsepower each, and making 450 revolutions a minute. There has been much controversy over the seaworthiness of the chasers, although the speed has not been considered sufficient. Most of the chasers now used are 80 feet in length.—*N. Y. Times*, 3/10.

SUGDEN'S SUPERHEATER FOR THE STIRLING TYPE OF BOILER.—In the usual arrangement of superheater with this type of boiler the former is placed between the first and second bank of tubes. There are, however, certain particular objections to this arrangement, principally because of the very limited space available for cleaning, removing or replacing either boiler or superheater tubes.



SUGDEN SUPERHEATER FOR STIRLING TYPE OF BOILER

If the superheater is arranged with the headers either above or below the two sets of circulating pipes connecting the steam and water space of the drums, there are certain difficulties; if placed below the expanded joints of the tubes and the joints of the handholes affording access to the headers, they are in the path of the flame and heated gases, which is bad practice. In the alternative arrangement the headers are placed outside the superheater pipes, being inserted between the circulating pipes. This is the objectionable feature of placing the superheater tubes in the chamber between the first and second banks of tubes, as this increases the difficulty of taking out and replacing the boiler tubes as well as the superheater tubes.

In the new design, shown in figure, the superheater is placed in the first chamber, in close contact with the front wall of the boiler and in such a

position that access can be readily obtained for cleaning and inspection. It also avoids any complications in removing either boiler or superheater tubes.

Such an arrangement involves the danger of having the superheater projecting too far into the chamber and burning out. In this case this difficulty was overcome by placing the superheater tubes in a single header so arranged that the front and back rows were not more than about 4 inches apart, which prevents any excessive heat reaching the tube.

The superheater header is divided into three compartments and consists of two double groups of U-tubes, one group being placed immediately alongside the other.

If a superheater tube should fail, it is not necessary to shut the boiler down, as the tube can be plugged in a few minutes. For this purpose a steam stop valve is placed on the inlet side of the superheater, so that it is only necessary to discharge the steam from the superheater to re-expand or stopper a tube, which can be done in a few minutes without letting the steam out of the boiler.

The following particulars are given of the working of this superheater on a Stirling boiler at the Blain Colliery. The boiler has a heating surface of 1620 square feet and a grate surface of 32 square feet and is capable of evaporating under normal conditions of working about 6500 pounds of water per hour. The working pressure is 160 pounds per square inch, giving a temperature of 370° F. The superheat added to the steam at this temperature is 180° F., making a total steam temperature of 550° F. (*Engineering*, Vol. 104, No. 2693, August 10, 1917, p. 147, 3 figs., *d.*)—*The Journal of the American Society of Mechanical Engineers*, October.

MENACE TO NAVAL OIL SUPPLY.—Another step in the conspiracy to deprive the navy of the proven part of the petroleum reserves and seriously interfere with its source of supply of oil as a fuel for ships of war is the report of the Senate public lands committee on the bill S. 2812, famous as the object of criticism and protest on the part of the Secretary of the Navy and the engineer-in-chief of the navy for several years. The report is a remarkable document in that it contains so many inaccurate statements in support of the measure, and it is expected that the Senate naval committee will be asked to interpose an objection to the passage of the bill with its present objectionable Section 16, despite the recommendation of the public lands committee. The tract of oil lands in question, 7680 acres of the 30,000 acres in petroleum reserve No. 2, contains but 5½ per cent of the oil in all California, and it is determined by the naval authorities to protect this valuable possession from loss, especially as the whole available supply of oil in this country will last only about 20 years, while the coal supply is practically unlimited. A sample of the reckless assertions contained in the committee report is the statement that "it is better to let future wars take care of themselves than to lose the present one through dreams of far-off conservation, technical disputes as to methods, and puerile bickerings as to jurisdiction between government bureaus." The Navy Department persists in its position that Congress must look out for the future as well as the present and that the exhaustion of the oil resources a few years hence is a prospect that justifies precautionary and protective measures now. The naval authorities are prepared to combat the measure in its present state to the end and to take issue with all the artful claims that are made in behalf of the legislation which jeopardizes the naval oil reserves and threatens to cripple the sources of supply of indispensable naval fuel. The Bureau of Steam Engineering has fought this pernicious legislation from the first with vigor and determination, and the indications are that the plot to deprive the navy of its possessions in this direction will be defeated.—*Army and Navy Register*, 22/9.

SPARK LENGTH IN VARIOUS GASES AND VAPORS.—The following article by Robert Wright was published in *The Journal of the American Society of Mechanical Engineers,* October:

The different factors affecting the phenomenon of electric discharge, in so far as the length and nature of spark, voltage, gas pressure and temperature relations in the spark are affected, have formed the subject of a large number of investigations (compare *The Journal* for January, 1917, p. 86), but the wider chemical relations have been investigated a good deal less.

Natterer, in 1889, published an examination of the spark discharge through a number of gases and vapors at atmospheric pressure. His method of investigation appears to have been, however, quite crude, and the data cannot be relied upon.

As regards the effect of temperature of the gas on the spark, Harris, in 1834, and Cardani, in 1888, both found that the temperature has no effect on the spark, provided that the number of molecules per cubic centimeter of the given gas remains constant. That is to say, if the spark gap be enclosed in a gas-tight vessel, then the voltage required to produce a spark will be quite independent of the temperature; but if the vessel be left open so that the gas can expand at atmospheric pressure, then increase of temperature causes increases of spark length for a given voltage. The effect is exactly the same as if the gas concentration had been reduced by lowering the pressure in the ordinary way, the temperature remaining constant. In the present investigation a 20 mm. gap at 100° C. was found to correspond with 15 mm. at 18° C. and 20 mm. at 183° C. with 5 mm. at 18° C.

TABLE I.—RELATIVE SPARK LENGTHS IN MILLIMETERS

Substance	Air gap 30 mm.	Air gap 20 mm.	Temperature, deg. cent.
Methane	29	20	100
Methyl chloride	24	16	100
Methylene chloride	9	6	100
Chloroform	5	3.5	100
Carbon tetrachloride	1.5	1	100
Methyl bromide	12	9	100
Methyl iodide	8.5	5.5	100
Ethane	24	18	100
Ethyl chloride	21	16	100
Ethyl bromide	9	6.5	100
Ethyl iodide	6.5	4.5	100
Ethylene	35	27	100
Acetylene	32	26	100
Water	40	36	138
Methyl alcohol	30	26	138
Ethyl alcohol	23	19	138
*iso*Propyl alcohol	18	15	138
*iso*Butyl alcohol	16	13	138
Ethyl formate	14	..	138
Ethyl acetate	11	..	138
Ethyl propionate	8	..	138
Carbon dioxide	16	11	100
Sulphur dioxide	10	6	100
Carbon disulphide	8	5	100
Hydrogen sulphide	17	12	100

"MYSTERIOUS" GASOLINE EXPLOSIONS.—An interesting though hardly novel experiment in the use of gasoline on shipboard was made recently at a place which need only be indicated as "Somewhere" on a vessel of some 70-odd feet length, by name *T. Q. XXX.* A stop was made at a gasoline

station to fill the tank, of several hundred gallons' capacity. A deck plate was unscrewed, the tank being some distance below the deck and closed by the usual screw plate, which was also removed. There was no vent to the tank, no indicator to show when it was full, and no pipe connection between tank and deck. The tank being "empty," naturally contained a highly explosive mixture of air and gasoline. When a 3-inch hose was inserted and the gasoline turned on there was only one place where this heavy mixture could go; it was expelled from the tank and rolled over the top, beneath the deck, and fell into the bilge. Whether the filling operation was accompanied by the usual overflow of liquid gasoline as well is not stated. The tank was closed, the deck plate screwed down and the engines started to back out of the slip, when the inevitable happened; the sides of the vessel bulged below water, the deck lifted, carrying a badly injured man with it; two others badly burned went overboard forward and two more fortunate ones on the after deck escaped with a mud-and-water bath. Four men were taken to the hospital. As ample means for fire-fighting were at hand the fire was soon extinguished and the bilged hull pumped out and secured from sinking. A brief account of the "accident" found its way into some of the papers with the information that no cause could be assigned for the "mysterious explosion"; still another similarly designated as "mysterious" was reported a short time later, but of this we have no details.

There was a time some years ago when such occurrences were in a measure excusable, the nature of gasoline vapor, its weight and the certainty of it reaching the lowest part of a vessel and lying there like a shot until removed by force not being generally understood. To-day there is no excuse for a designer or builder who will countenance such an installation as described, and equally little for the master of a vessel who, when unfortunate enough to be in charge of such an installation, does not know the danger and guard against it.—*The Rudder,* October.

MERCHANT MARINE

SAILING SHIPS BARRED FROM WAR ZONE.—No more goods will be shipped through the war zone from the United States on sailing vessels. The Exports Administrative Board announced September 28 that at the request of the Shipping Board and the Navy Department it had instructed the Bureau of Export Licenses to refuse license for such shipments.

It is obvious, said the board's statement, that steamers can navigate the war zone with less danger than slow sailing craft, and sailing ships, if used in safer water, would to an extent release steam vessels now used in such waters.

Attracted by the enormous charter rates for transatlantic traffic, a number of American sailing ships, particularly coastwise coal-carrying schooners, have been diverted to that trade in spite of the War Risk Insurance Bureau's refusal to grant them insurance.—*Washington Post,* 29/9.

METHOD USED IN REQUISITIONING SHIPS.—Announcement of the general method by which the American merchant marine is to be requisitioned by the government was made by Bainbridge Colby, of the Shipping Board, in a notice sent to shipowners. The notification reads:

"The United States Shipping Board hereby gives notice to all owners of ships registered and enrolled under the laws of the United States that the requisition of all American steamers described below and of which previous announcement has been made will become operative and effective on October 15, 1917, at noon.

"1. The ships affected by said requisition and included therein are: (a) All cargo ships able to carry not less than 2500 tons total dead weight, including bunker, water and stores; (b) all passenger steamers of not less than 2500 tons gross register.

"2. (a) As to all steamers in or bound to American ports on October 15, 1917, requisition become effective after discharge of inward cargo and ship is put in ordinary good condition; (b) as to steamers which have started to load their outward cargo requisition becomes effective at noon on October 15, 1917, and accounts as to hire and expenses will be adjusted from time steamers began to load.

"3. Steamers, trading to and from American ports, that have sailed on their voyage prior to October 13, 1917, at noon, are to complete that voyage as promptly as possible and report for requisitioning.

"4. Steamers that are occupied in trades between foreign ports shall be requisitioned as of October 15, 1917, at noon, and accounts adjusted accordingly. (a) Owners whose steamers are operating in their regular trades are to continue the operation of their steamers for account of the government, as they have been doing for themselves, until they receive further instructions; (b) owners whose steamers are chartered to others will apply to the Shipping Board for instructions regarding the future employment of said steamers."—*Washington Post*, 13/10.

Rates Fixed by the Government.—For freight vessels the monthly rates per ton, figured on time charter on a basis of dead-weight tonnage, are as follows:

More than 10,000 tons, $5.75; 8001 to 10,000 tons, $6; 6001 to 8000 tons, $6.25; 4001 to 6000 tons, $6.50; 3001 to 4000 tons, $6.75; 2500 to 3000 tons, $7.

Vessels of a speed in excess of 11 knots will be allowed 50 cents a ton additional for each knot or fraction over 11.

For passenger vessels the board adopted a twofold basis of classification: Class A, comprising steamers with a capacity of more than 150 passengers, and Class B, those with a capacity of from 75 to 150 passengers. Steamers in both ratings are further classified according to speed. Passenger steamer rates, based on time charters, and figured gross register, are:

Class A: 10 to 11 knots, $9 a ton; 12 knots, $9.50; 13 knots, $10; 14 knots, $10.50; 15 knots, $11; more than 15 knots, $11.50.

Class B: 10 to 11 knots, $8 a ton; 12 knots, $8.50; 13 knots, $9; 14 knots, $9.50; 15 knots, $10; more than 15 knots, $10.50.

Army and Navy to Man Ships.—Some of the vessels to be requisitioned, which will be used exclusively for army and navy service, will be taken over on a bare-ship basis. These vessels will be manned and operated by the army and navy instead of by the owners. The rates fixed for their use are $4.15 for cargo boats and $5.75 a ton gross for passenger steamers of 11 knots speed, with an additional allowance of 50 cents a ton for each knot in excess of 11 up to 16 knots.

All of the rates are tentative. The board, it is announced, will examine carefully the results of operation under the rates, and will determine on any revision that appears to be necessary for fair treatment of the vessels' owners. Revisions will be made, if found necessary, at intervals of not more than 90 days.

The government will assume the war risks on the ships requisitioned, and in some instances the marine risk as well. Where the marine risk is assumed the usual rate for this insurance will be deducted from the charter price.

Within less than six months virtually every one of the 458 American vessels now available for ocean service, including regular liners, will be either in the service of supplying American troops and warships abroad or in trade considered vital to the conduct of the war. The intention of the government is to replace ships drawn from regular trade routes and from the coastwise service with neutral tonnage, for which negotiations are pending with neutral governments. Foreign ships will be admitted into the coastwise service by suspension of the coastwise shipping laws. A bill to make this suspension possible is before Congress.—*N. Y. Times*, 28/9.

Secretary Daniels has vetoed the suggestion of members of the Navy General Board that crews of naval seamen be placed on merchant vessels operating in transatlantic trade, to reduce war zone hazards and avoid dangers from employment of alien crews. Secretary Daniels said that the disturbance of labor markets by the employment of naval forces in place of civilian crews would not be justified. Where request is made for the use of naval crews they will be furnished. Some such requests have already been made. Naval crews will continue to operate American troop transports, Secretary Daniels said, but there will be no general employment of enlisted men of the navy to do the work of the civilian seamen.—*Shipping*, 6/10.

SHIPPING AND THE WAR.—The British Controller of Shipping authorized the Associated Press to say in his name that the Allies rely more upon American shipping than upon American soldiers. The Allies are even fearful that the diversion of shipping to service in transporting American troops will weaken the fighting strength of the Allies as much as American troops will reinforce them. If this is not to be so, the United States, he says, must outbuild the destruction of shipping by submarines. He estimates that this will require from the United States the building of 6,000,000 tons of shipping in a year, three times the British record and five times the American record. It would require fabrication of 3,500,000 tons of steel, but even this, he thinks, could be done if the United States should exert itself comparably with the efforts of the Allies.

There are now 1036 ships under construction in this country, some to be ready in 60 days. The total tonnage building is 5,924,000. The United States is operating 2,871,359 tons of shipping capable of engaging in foreign trade. Within a year we shall have 9,200,000 tons of shipping, or five times the amount at the last statement before the war began. Last week the House passed the bill admitting foreign ships to coastwise trade for the period of the war. That adds to the tonnage serving the Allies through the United States a half million tons, perhaps more, for the admission of those ships to the coastwise trade will release equivalent tonnage to the ocean service. Moreover, Congress is asked for funds for the purchase of five millions of tonnage now building, but not likely to be completed in time to serve the need set forth by the British Controller.

So far as the government controls the situation, we measure up to the demands upon us by our friends, and did it before we were asked. But the realization of the program depends upon the good will of the men for whose wages the United States has authorized loans of eleven billions. There is no disposition to be miserly in paying for this labor, but the men are asking more than pay. Some of them are asking that others shall not be allowed a share of the work. Others are striking without grievance of their own. Thus, the ironworkers' strike in San Francisco grows out of the traction strike, and the whole movement is part of a political campaign. The situation is so little promising that Army Headquarters, on September 29, authorized the statement that "the existing military situation shows conclusively that any delay or obstruction in the shipbuilding program is one which favors our enemy, the German nation, and delays and obstructs the termination of the war."

The Pacific Coast strikes are not consistent with the engagements made on the part of the unions by their leaders, and the unions are discouraging their men in their procedure. But the strikes persist. Unless this obstruction is promptly removed the public will wish the responsibility placed more clearly than now.—*N. Y. Times*, 30/9.

MERCHANT SHIPS UNDER CONSTRUCTION.—A revised table showing the shipping facilities upon which the United States and its allies may depend during the next 18 months or more to fight the German submarines was issued September 26 by the United States Shipping Board.

Differing slightly from a statement earlier in the day by the Committee on Public Information, the table shows that the government has under construction in dead-weight tonnage, including 400 vessels of foreign ownership which were requisitioned on the stocks, approximately 1036 cargo vessels of 5,924,700 tons capacity. Most of these vessels will be completed by the end of 1918 and some of them will be off the stocks within 60 days. These vessels have actually been contracted for.

Congress, it was pointed out, also had before it a bill asking for funds with which to construct or purchase approximately 5,000,000 tons dead weight, which will be completed in 1918 and 1919, raising the total of new construction under contract and prospect to 10,924,700 tons dead weight. Reduced to gross tonnage, this represents approximately 7,283,000 tons.

The statement issued by the Committee on Public Information showed that the government now had in service for foreign trade 458 ships with an aggregate dead-weight tonnage of 2,871,359 tons, not including 117 ships of German and Austrian origin totaling 700,285 tons, thus giving a grand total available for service to-day of 575 vessels of 3,571,644 dead-weight tons. In June, 1914, the statement read, the available tonnage of the United States was only 1,614,222 tons.

The Committee on Public Information gave the available vessels as of 3,571,644 dead-weight tons, or approximately 2,380,000 gross tons. With these figures the total tonnage now in service and either under construction or contemplated amounts to no less than 14,496,354 dead-weight tons, or about 9,663,000 gross tons.

These, it was pointed out, would represent the capacity of the vessels under American control when the present government plan was completed, if the vessels of foreign ownership commandeered on the stocks were retained by the United States. It does not, of course, take into consideration the vessels which may be sunk by submarines before the government plan is completed.

A chart prepared by the Shipping Board which, it was stated, represented the gross tonnage of the world (enemy countries not included) available for transatlantic trade three weeks ago, placed the liners owned by Great Britain at 4,860,000 gross tons and the tramp steamers at 8,540,000 gross tons. The United States was credited with approximately 2,000,000 gross tons. Here is the table:

WORLD'S AVAILABLE TONNAGE

	Atlantic	Pacific
United Kingdom—		
Liners	4,860,000	650,000
Tramps	8,540,000	450,000
Norwegian	1,800,000	50,000
Sweden	860,000	.....
Denmark	690,000	.....
Holland	1,200,000	275,000
United States	2,000,000	400,000
French	1,600,000	220,000
Italian	1,250,000	70,000
Greek	47,000	.....
Spain	750,000	.....
Portugal	150,000	50,000
Russia	350,000	200,000
Belgium	280,000	.....
South America	600,000	200,000
China	.....	35,000
Japanese	100,000	1,900,000
Total	25,500,000	5,500,000

Vessels on inland waterways and in the Baltic are estimated at 6,000,000 tons gross; coastwise shipping at 6,000,000 tons, and enemy shipping at approximately 5,000,000 tons. These are not accounted for in the table.

The figures made public to-day were read with keen interest because of many conjectures that have been made as to the ability of the United States to provide sufficient tonnage to fight the submarine menace successfully. Of the progress being made in new construction the Committee on Public Information said:

"The fleet in prospect is already becoming a reality. Several of the commandeered ships are already taking cargo; others will leave the ways in increasing numbers with each succeeding month. The ships for which the Shipping Board has contracted are under construction and the first launching is expected within 60 to 90 days."

Supplementary to this statement, the Shipping Board made an important announcement concerning its program, which was revised by Chairman Hurley and Admiral Capps, General Manager of the Emergency Fleet Corporation. It read:

"During the past two months the Emergency Fleet Corporation has awarded contracts for 118 wooden vessels, of 3500 tons dead-weight capacity each, to 27 different shipyards. There had previously been awarded contracts for 235 wooden vessels of similar type to the above, and for 58 vessels of composite construction, thereby making a total award to date of 411 wooden and composite vessels of an aggregate dead-weight tonnage of 1,460,900.

"During the past two months the designs for machinery have been completed for the manufacture of engines, boilers, and other articles of equipment for these vessels, for which the facilities available of machine shops and boiler works throughout the country have been availed of. Specifications have been prepared and negotiations outlined and initiated for the assembly and installation of machinery in wooden vessels, the most of which have been, or are being, constructed as 'hulls only.'

"Great difficulty has been experienced on the Atlantic coast in obtaining suitable lumber for these ships, and it is anticipated that there will be greater delay in their completion than was expected when this movement was begun, notwithstanding every possible effort on the part of the corporation and its contractors.

"Since August 1 there have been awarded contracts for 155 steel cargo vessels of 1,076,800 tons dead-weight tonnage, distributed among six shipyards. The most important of these contracts are for vessels of the so-called fabricated type and special shipyards are being prepared for them.

"Contracts for the boilers, machinery and steel construction of these vessels have already been placed and the contractors are actively at work in the preparation of the sites for the assembling of the ships. The best efforts of the Emergency Fleet Corporation are devoted to expediting these great shipbuilding projects.

"Previous to August 1, 70 steel cargo vessels of 587,000 tons total dead-weight capacity had been contracted for. These vessels were distributed among 10 shipyards. Therefore, at the present time, the total number of steel vessels under construction for the United States is 225, with a total aggregate dead-weight tonnage of 1,663,800.

"By proclamation of August 3, 1917, the fleet corporation under authority delegated by the President under the provisions of the Emergency Act, approved June 15, 1917, requisitioned all vessels under construction in the shipyards of the United States of 2500 tons dead-weight capacity and above. By this act the United States acquired a total number of 403 vessels, determined by the progress report obtained from the various shipyards to be actually under construction; in many cases, where keels had not actually been laid, engines, boilers, equipment, and materials, all of which also were requisitioned, are in various stages of progress; and in comparatively few cases contracts existing for vessels not actually begun

which may or may not be proceeded with as the merits of each case, compared with what is desirable construction, are considered.

"The total dead-weight tonnage under construction thus acquired and on which orders have been issued to proceed with maximum expedition exceeds 2,000,000 tons dead weight.

"There are now under construction for the Emergency Fleet Corporation:

Number of Vessels	Type of Vessels	Total Dead-weight Tonnage
353	Wood	1,253,900
58	Composite	207,000
225	Steel	1,663,800
Requisitioned Vessels		
400		2,800,000
Grand Totals		
1,536		5,924,700

"In addition to the above, Congress, in a pending bill, is authorizing the construction of additional vessels whose total dead-weight capacity will be nearly 5,000,000 tons. Plans for the major portion of these additional vessels are now in course of preparation, and many of them will be of special types adapted to particular necessities of war, and, while substantially cargo carriers, will have much greater speed than the cargo vessels now under construction.

"The corporation has ascertained from the builders of requisitioned vessels their demands for structural steel, machinery, and various items of equipment, and is endeavoring to regulate the supply of those items to provide for the individual needs of the shipbuilders in accordance with their program of capacity so far as the country's resources are available, and it is apparent with the apparent needs of the naval service and the War Department with which the Emergency Fleet Corporation is working in harmonious cooperation, every mechanical resource of the United States, with considerably increasing development, will be necessary to the realization of this program and what must follow in continuation of it.

"The fleet corporation has instituted an industrial service department, which by cooperation with the Department of Labor is undertaking to assist shipbuilders and others in the employment of suitable labor, and to initiate an extensive system of vocational training with the purpose of adapting allied trades and unskilled labor for service in shipyards and through cooperation with the Y. M. C. A. organization throughout the United States to give attention to the housing and personal affairs of the men recruited for shipbuilding work.

"The vast development of shipbuilding essential to this emergency necessitates an agency of this kind because up to this time the thinning out of unskilled labor in the older shipbuilding over a large territory in many instances is resulting in greatly reduced production. It has been estimated that 150,000 new men are necessary for full protection.

"With the passage of the pending bill the Congress will have authorized $1,799,000,000 for the Shipping Board and the Emergency Fleet Corporation."—*N. Y. Times*, 27/9.

SAFETY RULES FOR SHIPPING.—As a safety guide for ships crossing the war zone, the U. S. Shipping Board has issued a booklet of suggested regulations entitled "For the Protection of Ships Imperiled by Mines or Submarines," from which the following is extracted:

Watertight Bulkheads, Tunnels and Doors.—Watertight bulkheads, tunnels and doors should be maintained at all times in an efficient condition. Doors operated by a ratchet are not efficient in an emergency for the reason that they cannot be closed quickly, and the ratchet should be supplemented by a wheel and handle or other geared device affording continuous closing action.

The master should designate the chief engineer or some other officer as directly responsible for the working of watertight doors. Before each voyage such officer should have the doors opened and closed in his presence; should satisfy himself that they are in good working order; and should furnish to the owner or to his marine superintendent a certificate in writing to that effect. The facts should be so reported to the master, and an entry accordingly should be made in the official log, signed by the master as well as by the officer in charge.

Inspection should be made as often as possible during the voyage to determine that the doors are in serviceable condition, and door drills should be practiced at regular and frequent intervals, an entry on each such occasion being made in the official log.

Watertight doors should be opened at sea only when absolutely necessary, and then upon express direction of the master. Doors not required to be opened at sea should be closed and secured before the commencement of each voyage and should be kept closed until the ship arrives at destination.

Watertight doors in passage ways from firemen's quarters to stoke holes should be kept closed, firemen entering and leaving stoke holes by means of fiddey ladders. Where ladderways are provided for the exit of crews or passengers from quarters below decks, watertight doors used solely for access to such quarters should be kept closed.

Where practicable, watertight trunks should be filled from bulkhead decks to shaft tunnels and tunnel doors should be kept closed. If there are side bunkers, or bunkers the doors to which are in non-watertight bulkheads, coal should be worked from such bunkers while in danger zone, and doors to watertight bulkheads should be kept closed. Also where practicable, chutes should be provided to permit the use of coal carried between decks or in bridge space in order that the opening of lower watertight doors may be avoided. Having due regard to operating conditions, coal for use in danger zones may be stored on stoke hole plates in advance of entering such zones.

When watertight doors are opened at sea members of the crew detailed for that purpose should stand by to close them promptly when so ordered, and thereafter immediately should so report their action to the master.

Portable plates on bulkheads or tunnels, sluice valves and manholes in double bottoms, should be closed and rendered watertight before the ship leaves port.

Openings in Ships' Sides.—With the exception of ash chutes and similar apertures required to be opened at sea, side scuttles and other openings in ships' sides below the uppermost continuous decks and in the first tier of erections above that deck should be kept closed while the vessel is in a danger zone. Ash chutes and slop chutes, unless they extend to the bulkhead deck and are at least 15 feet above water, should be fitted with suitable appliances for closing watertight, and should be kept closed except while actually in use.

Sanitary discharges and scuppers below the bulkhead deck and less than 15 feet above water, unless equipped with appliances which under pressure will be watertight, should be closed, as should be also all other sanitary discharges the use of which is not indispensable.

Where side scuttles below the uppermost continuous deck are fitted with inside metal dead lights or outer metal plugs, or both, the plugs should be shipped in place and the dead lights should be closed. Side scuttles, if provided with neither dead lights nor outer plugs, and unless at least 15 feet above water, should be permanently closed and made

watertight by riveted or bolted plates, or in some other equally efficient manner.

Bilge Pumps.—Bilge pumping installation should be maintained at all times in an efficient condition. Before the commencement of each voyage bilges and strum boxes in holds and machinery compartments should be cleaned and defects in the system should be corrected.

If practicable, an additional screw-down non-return valve should be fitted in each pipe line on the watertight bulkheads inside compartments in which strum boxes are located, and valves should be secured by studs screwed into bulkheads.

Stowing of Cargo.—Weight cargo, whenever practicable, should be so distributed throughout the ship and so combined with measurement cargo that the total tonnage in each compartment will not exceed the weight of a corresponding bulk of water.

Prevention of Heeling.—The ship's freeboard should not be unnecessarily reduced by the addition of water ballast, but if the nature or amount of cargo, in conjunction with the bunker coal on board, is such at any time as to permit a serious list if holed by a mine or a torpedo, the ballast tanks should be filled. The vessel, however, should not be overladen.

Ships sailing light should carry additional ballast. If the initial stability in insufficient to prevent a serious list, and if the vessel is constructed with longitudinal bulkheads, such as wingbunker bulkheads, the doors of the wingbunkers should be opened in order that water entering the vessel may flow as freely as possible through the longitudinal bulkheads.

Emergency Lights.—Living and working spaces which may be darkened by the closing of side scuttles should be provided with efficient artificial light. In addition adequate light should be provided for egress from living compartments to decks and for the launching of boats and the embarkation into them of those on board. For this purpose lanterns suitably placed are recommended, as electric lighting systems may be rendered inoperative by a mine or torpedo explosion. While traversing a danger zone lanterns should be kept burning, but obscured from view until required. A supply of electric torches should be provided.

Berthing of Passengers.—While traversing a danger zone passengers should be berthed above the uppermost continuous deck, and watertight doors, and scuttles in passengers' quarters below that deck, as well as sanitary discharges connected with such quarters, should be kept closed.

Smoke Screens; Camouflage.—Every vessel operating in a danger zone should carry on deck not fewer than one dozen smoke boxes, approved by the Bureau of War Risk Insurance, and capable of evolving smoke when thrown overboard. The painting of vessels so as to render them invisible at sea is also recommended.

Abatement of Smoke.—The emission of smoke has frequently disclosed to submarines the presence of vessels subject to attack. Particular care, therefore, should be observed in stoking boilers in a danger zone, in order to minimize the amount of smoke emitted. To this end, the fires should be stoked lightly and often and should be kept clean and even. The emission of smoke can be practically eliminated by the use of anthracite coal and a sufficient supply of such fuel should be provided for the daylight period on each voyage.

Plugging of Shell Holes.—An adequate supply of wooden plugs, preferably of spruce timber, 2 feet long by 8 inches, tapering to 2 inches, in diameter, should be kept available for the stopping of shell holes.

Warning of Engine Room Staff.—The explosion of a mine or a torpedo may result in the disabling of the engine room telegraph or telephone, and suitable provision for such an emergency should be made whereby the master or officer in charge may give immediate warning to men on duty in the engine room, stoke holes or other compartments below decks. A mutual understanding should exist whereby such men may know that they will be advised by a predetermined signal when it is time for them to leave their posts.

Lifeboats.—While a ship is in a danger zone lifeboats attached to davits should be carried, if possible, in the outboard position, gripped to spars or otherwise secured in such manner as to be ready for immediate lowering. Inboard boats should be transferred to the ship's side under davits ready for hooking on.

Where lifeboats are stowed on the poop, or near the after end of a ship, the cleats should be so placed that boats when lowered and freed from the tackles will be held, when the ship is light, clear of the counter and propellers.

Each lifeboat should be provided with two painters, one of which should be fitted with a strop and toggle, with the end led forward and belayed to a cleat or other suitable fixture on the deck or bulwark. The other painter should be kept coiled in the boat for use if required after launching.

The safe lowering of a boat depends largely upon the falls being clear for running and masters and officers should impress upon their crews the fact that while a boat is being lowered the men tending the falls should lower in unison and thereby keep the boat approximately level.

In order to keep the boats from coming down with a run, where lowering bollards are not provided, a round turn should be taken with the fall around the davits below the cleat, before the fall is coiled.

Boat drills should be required and life saving appliances should be frequently examined. Masters and officers should satisfy themselves by personal inspection that every lifeboat has on board the equipment required by the life-saving regulations, including a sufficient quantity of provisions and water; that plugs are securely attached to the margins of the plug holes, and that boats' falls are wound on reels or otherwise so efficiently stowed as to be immediately available for use without danger of becoming fouled.

Pontoon lifeboats may be stowed, if necessary, elsewhere than abreast of davits. The covers of lifeboats and pontoons should be removed before entering a danger zone, as should be also all obstructions which might prevent the lifeboats floating off vessel's deck, including the boats' gripes when weather permits.

In order to provide protection for passengers or seamen who may be compelled to leave the ship with insufficient clothing, every lifeboat should be furnished with an abundant supply of blankets rolled up tightly and properly stowed under thwarts or elsewhere.

Life Rafts and Buoyant Apparatus.—Every passenger vessel operating in a danger zone should be provided with sufficient life rafts and buoyant deck seats or other buoyant apparatus suitably stowed on deck to accommodate at least 50 per cent of the total number of persons on board.

Rafts and buoyant apparatus should not be lashed or fastened otherwise than by means of gripes, and should be stowed in such manner as to be free to float off the vessel's deck when gripes are slipped. Wire rope gripes equipped with short lengths of chain and slip links are recommended as adaptable to a quick release.

Life Jackets.—No ship should carry more than two types of life jackets, and such appliances should either be issued to the persons by whom they are to be used or so placed as to be readily accessible in cases of emergency. The master of a passenger ship should satisfy himself that every passenger has been provided with a life jacket, is familiar with the manner of its adjustment and use and has been instructed either to wear it constantly or to keep it within immediate reach while in a danger zone.

Before entering a danger zone musters should be held at frequent intervals and passengers should be required to attend with life jackets and to adjust the same under proper direction.

Seamen's Discharge Books; Warm Clothing.—Seamen's discharge books should be distributed on entering a danger zone. Passengers and seamen should be enjoined to keep themselves warmly clothed and to be ready at all times for an emergency.—*Shipping*, 6/10.

SHIPPING LOSSES.—The following table published by the New York *Journal of Commerce* shows the results of encounters between U-boats and British, French and Italian merchant vessels during the six months from March to August, 1917, inclusive. The figures given are the official corrected records of the three allied governments named:

Week ending	Attacked	Sunk	Escaped
March 4	40	25	15
March 11	37	22	15
March 18	62	39	23
March 25	52	38	14
April 1	53	31	22
April 8	45	28	17
April 15	56	37	19
April 22	95	59	36
April 29	99	60	39
May 6	95	56	39
May 13	48	29	19
May 20	47	31	16
May 27	50	23	27
June 3	42	24	18
June 10	70	44	26
June 17	81	37	44
June 24	55	33	22
July 1	47	30	17
July 8	49	23	26
July 15	40	25	15
July 22	45	24	21
July 29	34	24	10
August 5	50	31	19
August 12	44	26	18
August 19	49	29	20
August 22	41	30	11
Total	1,426	858	568
Weekly average	54.8	33.0	21.8

—*Shipping*, 6/10.

FOREIGN VESSELS IN U. S. COASTWISE TRADE.—The House Committee on the Merchant Marine and Fisheries, to whom was referred the bill (H. R. 6175) giving the U. S. Shipping Board power to suspend present provisions of law and permit vessels of foreign registry, and foreign-built vessels admitted to American registry under the act of August 18, 1914, to engage in the coastwise trade during the present war and for a period of 120 days thereafter, except the coastwise trade with Alaska, have reported it to the House with the recommendation that it be passed. The full text of the bill is as follows:

"*Be it enacted, etc.,* That during the present war and for a period of 120 days thereafter the United States Shipping Board may, if in its judgment the interests of the United States require, suspend the present provisions of law and permit vessels of foreign register, and foreign-built vessels admitted to American registry under the act of August 18, 1914, to engage in the coastwise trade of the United States: *Provided,* That no such vessel shall engage in the coastwise trade except upon a permit issued by the United State Shipping Board, which permit shall limit or define the scope of the trade and the time of such employment: *Provided further,* That in issuing permits the board shall give preference to vessels of foreign registry owned, leased or chartered by citizens of the United States or corporations thereof: *And provided further,* That the provisions of this

act shall not apply to the coastwise trade with Alaska or between Alaskan ports."

The report says:

"It will be noted that the bill gives the U. S. Shipping Board power to suspend our navigation laws relating to the coastwise trade during the present war with Germany and for a period of 120 days thereafter, and permits—

"1. Vessels of foreign registry to engage in the coastwise trade of the United States.

"2. Foreign-built vessels admitted to American registry under the act of August 18, 1914, to engage in the coastwise trade of the United States.

"3. That no such vessels shall engage in our coastwise trade except upon the following limitations and conditions:

"(a) Upon permits issued by the U. S. Shipping Board limiting and defining the scope of the trade and the time of such employment.

"(b) In issuing permits the Shipping Board shall give preference to vessels of foreign registry owned, leased or chartered by citizens of the United States or corporations thereof.

"(c) The coastwise trade with Alaska and between Alaskan ports is excepted from the provisions of the act.

"This is one of the many measures framed to meet the emergencies created by the war with Germany and our participation in that war. Its enactment at any early date is absolutely necessary to supply the needs of our domestic commerce growing out of the diversion of a large part of our coastwise tonnage to the over-seas trade."—*Shipping*, 6/10.

AN END TO SHIPYARD STRIKES.—Strikes in Atlantic and Pacific shipyards, in flat violation of the promise of President Gompers of the American Federation, show how lightly patriotism and honor are regarded by a great part of the present shipyard labor of the United States. It is currently explained that the trouble has usually originated among aliens, and there has been strong suspicion that these strikes were fomented by German interests. The thorough Americanizing of shipyard crews is really something that must be attempted as soon as possible. These men hold a peculiarly close relation to the government, for on their willingness to work depends the construction and maintenance of an adequate war and commercial fleet. Shipyard labor in unscrupulous or disloyal hands can take the government by the throat at any time—and it is, therefore, exceedingly important that this labor should not be permitted to be either unscrupulous or disloyal.

Doubtless the difficulty is due in a considerable measure to the depressed condition of ocean shipbuilding in this country before the present war. Americans by birth or naturalization instinctively seek the most prosperous industry for their employment, realizing that in proportion as an industry is strong it can pay and usually does pay the most liberal prices for its labor; so that the government which has neglected shipbuilding and refused to protect it as other national industries are protected is not without its own responsibility for the deplorable situation of the past few weeks.

It is almost inconceivable that the kind of workmen who built the clipper ships of years ago and the steam cruisers of the Civil War would have taken advantage of the nation's needs to extort excessive prices for their work at the risk of crippling the navy and starving the army. Those older American workmen had pride of country and love of country far beyond the average. A more polyglot element now fills our yards—but the majority of these men undoubtedly are honest men who can be shown their error and who will listen to reason. The problem of shipyard labor in this time of war emergency is a difficult problem, but it can be solved in a spirit of wisdom and patriotism. These shipyard strikes are a discredit to the nation. They are a real menace to the country. They must be ended if we are to win the war.—*The Marine Journal*, 22/9.

BRITISH SHIP LOSSES.—London, September 28.—British shipping losses since the beginning of the unrestricted submarine campaign last February now approximate the total losses before that period, according to a statement authorized by the Controller of Shipping. The statement indicated it was reasonable to expect Germany to destroy by next spring 200 vessels more than could be built in the meantime.

The Controller of Shipping authorized the Associated Press to make the following statement of the shipping situation and the urgent need for the United States to undertake a merchant shipbuilding program on a broad scale.

"It is of the utmost importance that the United States should realize that the shortage of shipping is the most vital fact in the present situation and the building of merchant ships is of the utmost importance.

"The question the United States must face is, whether, on the basis of the shipbuilding preparations she is now making, it will be possible for her to send any substantial force to France next spring without such a drain on the world's shipping as will subtract just as much from the fighting strength of the other Allies as her own forces will add.

"However large and powerful the army which the United States trains during the winter, it may be rendered absolutely useless as an addition to the fighting forces against Germany if there are no ships to transport it except at the cost of stopping the flow of vital necessities to the present armies.

"The loss of shipping since the beginning of the ruthless U-boat war is now roughly equal to the total losses prior to that time. By next spring Germany may be expected to destroy 200 vessels in excess of what are built in the meantime.

"Next spring this year's harvest will be largely exhausted, and the need of supplying Italy, France and Great Britain will be largely increased. At the same moment the United States will need a large increase in vessels to transport its army and to maintain it.

"What must be the program of the United States? It must be large enough to outbuild submarine destruction. Even if this means the building of 6,000,000 tons a year, which is three times the best the British have done and five or six times what the United States has previously done, this is not impossible if the United States puts into it an effort comparable with the efforts the Allies put into creating their armies, navies and munitions. To build 6,000,000 tons of shipping would require about 3,500,000 tons of steel, or less than 10 per cent of her output. It would take not more than 500,000 men, the majority unskilled.

"The task thus outlined is small compared with the effort put forth by the principal belligerents in other directions. Great Britain, for example, increased her army from 250,000 to over 5,000,000."—*Washington Post*, 29/9.

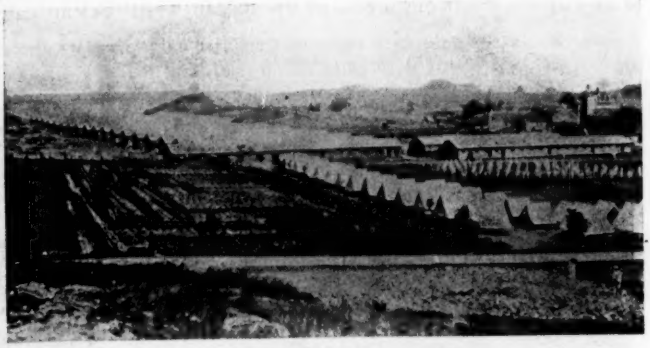
PERSONNEL

TRAINING BLUEJACKETS.—The following article by Walter Scott Meriwether was published in *The Rudder* for October:

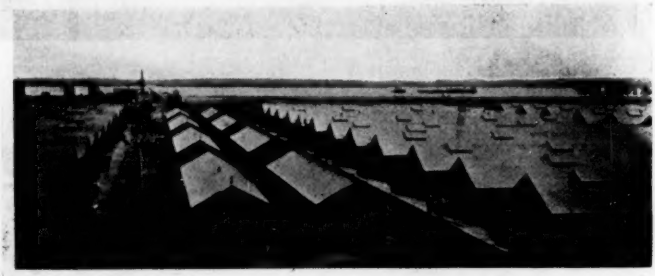
Since the declaration of war with Germany 133,000 recruits have been enlisted in the navy. During the same period 13,000 men have been added to the marine corps. All of those enlisting under the Union Jack and those joining the colors of the marines were volunteers and the vast majority of them were wholly untrained.

As it takes a much longer period to make an efficient man-of-war's man or an efficient marine than it does to turn out a soldier, as no ships were available for training purposes and as time was a matter of essence, the navy was confronted with the big problem of how to train men for shipboard life elsewhere than on ships, of how to predigest, as it were, this vast quantity of new blood.

In its usual efficient way the navy went at the job and so quietly has it worked that the public has heard little or nothing of an undertaking which has strung the nation's seaboards with training camps. More than 20 of these cantonments are now either completed or verging on completion.



SIDE VIEW OF BARRACK BUILDING. ELEVEN THOUSAND ARE NOW UNDER TRAINING AT NEWPORT



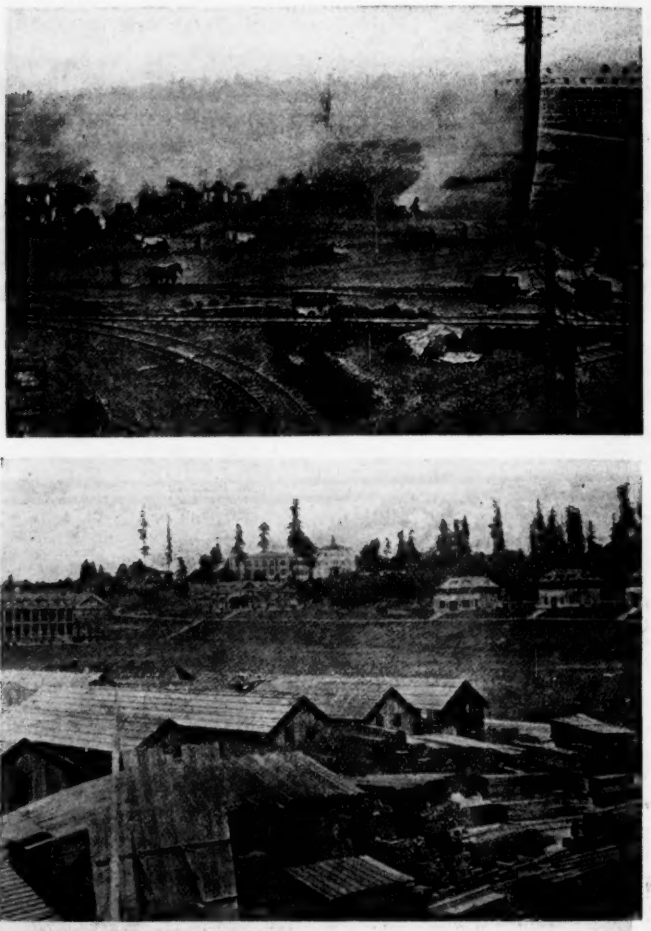
THE NEWPORT TRAINING STATION HAS BEEN ENLARGED BY BARRACKS TO ACCOMMODATE 8000 ADDITIONAL RECRUITS

The stations provide accommodations for an aggregate of 80,000 embryo bluejackets, while in Virginia and South Carolina are other stations which are to house 25,000 marines.

These training stations are not a mere jumble of huts pitched haphazard in any old place. They are model cities, built of wood and built

on sites which had been selected with utmost care, medical experts being asked to decide on the healthfulness of the locations while transportation experts were brought in to determine transportation facilities. Hundreds of sites were examined before selections were made.

Upon these sites little cities have sprung up with a speed far outrivaling that of any of the old boom towns of the golden west. Scientifically laid



CLEARING AWAY SITE FOR THE NAVAL TRAINING CAMP AT PUGET SOUND, JUNE 1, AND THE SAME SITE ON JULY 6, WHEN CAMP WAS NEARLY READY FOR RECRUITS

out, with provisions for roadways and walks, they also have water and sewer connections, central power plants which give electric light for streets and interiors, have storehouses for supplies of every description, including cold storage, ice plants, bakeries, cook houses, mess halls, shower baths, filtration plants, garages and garbage incinerators. At each canton-

ment there is also a large Y. M. C. A. pavilion—not government built, but playing an important and officially recognized part.

In the center of each cantonment has been emplaced a parade ground of fifty acres, a space which will be used for drill purposes and as a general recreation ground, where baseball and football will be played. The navy is very strong on athletics, for it realizes that it is through these fiercely contested games that brawn, muscle and initiative are best developed.

In each cantonment is a complete establishment for the reception of new recruits and where each batch of new arrivals must spend three weeks, during which time they are under the constant observation of medical officers. No infectious disease is to appear in these cantonments, if vigilance can prevent it. But the period of detention is not a period of idleness. During their stay in quarantine the recruits are taught how to care for themselves and the $60 outfit which the government furnishes free. Particularly are they taught personal cleanliness, not cleanliness as the average civilian knows it, but the supercleanliness of the navy. I have heard landsmen deprecate the stress laid by naval officers on cleanliness of ships and men. "Why should sailors wear white clothes," they ask, "and why, moreover, should they be continually busy scrubbing them and mopping decks? Why should officers give them such drudgery to do?"

This is the curiosity of ignorance. A sailor's first duty is to keep himself and his quarters clean, and he wears white so that his officer may know

CAMP FOR NAVAL RESERVE FORCE AT NEWPORT

at a glance whether or not he is clean. Primarily nothing contributes to the *esprit de corps* of personnel so much as the consciousness that they are a smart, tidy crew sailing shipshape aboard a smart, spick-and-span vessel. A feeling of alertness and pride is engendered. Also a ship possesses more capabilities of self-defilement than any other structure known to man. Cinders shower the quarterdeck from the roaring funnels; decks become foul and sticky after every mess-call; tar, paint, oil, graphite continually misplace themselves and call for removal to less mischievous localities. Neglected bedding would breed disease; unscrubbed decks would in two days reduce vessel and crew to the level of tramps. Therefore, it is constantly and persistently impressed upon the recruit that he must take pride in his endless combat with dirt as a preparation for the supreme test, battle—when the mere detail of an unclean deck or garment may be his death warrant through an infected wound. Cleanliness aboard ships is simply an extension of the modern aseptic operating-room idea.

Nor can any conversational filth be brought into these training camps, for, despite a widespread misconception, the navy is clean of mouth as its clean-lipped guns.

Each cantonment has a hospital unit, containing a thoroughly equipped dispensary, also anesthetizing and operating rooms and offices for the medical staff. The wards are as clean, cheerful and comfortable as wards can be made, many of them being fitted with sun parlors.

The commandant of one of the training stations pays this tribute to the recruits who have been sent to his station:

"They are good, strong, clean, vigorous young men—volunteers of the highest type—not slackers or shirkers. They are in it to learn and to serve their country—anxious to do credit to themselves and the service.

"They are adaptable and amendable to discipline, and of mature enough age to be highly effective. In my estimation the navy has never had finer material. Their spirit is right—no sulking nor faultfinding. With the preparations we have made and are making for their training I prophesy that the next few months will see an addition to our fighting forces, who, if given the opportunity, will make history worthy of our best naval traditions."

VIEW OF THE TRAINING STATION FOR NAVAL RECRUITS UNDER CONSTRUCTION AT LEAGUE ISLAND, PA.

While the recruits get a good rudimentary knowledge of navy work at these training stations, their real training must begin after they have joined the fleet for, of course, it is impossible to turn out a well-equipped seaman from a training station on dry land.—*The Rudder,* October.

HEALTH OF THE NAVY.—In compliance with directions from the Secretary of the Navy, the Surgeon General has furnished the following statement with reference to the health of the men in the navy and sanitary conditions at naval training stations:

"Health conditions in the navy, afloat and ashore, are, on the whole, very good, there being little serious illness. Some cases of measles and mumps continue to be reported from the Atlantic fleet. Measles is less prevalent than mumps at the present time, averaging only 10 cases per week for the whole force afloat.

"Conditions are excellent at all the shore stations, except at the naval training station at San Francisco, where there are a number of cases of measles and mumps.

"Sanitary measures which are being put into effect at all shore stations are having a good influence in many nearby cities and towns. Sanitary surveys of practically all the ports in which section bases are located have been made by sanitary officers attached to the various naval districts.

"In many instances where unsatisfactory conditions have been found the local authorities have responded promptly to suggestions, and they are showing a spirit of cooperation which is very gratifying, leading as it does to cleaner food, improvement of milk and water supplies, better methods of garbage and sewage disposal, and to campaigns against the fly and mosquito. In many places the sanitary work which is being done by the navy amounts to an educational process which will lead to permanent improvement in the sanitation of those civil communities which have felt the influence of the navy."—*Army and Navy Register*, 22/9.

CIRCULAR ON NAVY HEALTH.—Following is a letter sent to all naval medical officers, on the prevention and control of communicable diseases:

Reference: (a) Article 2901, Navy Regulations.

1. The bureau desires at this time before looking toward the future to express its very real appreciation of the manner in which medical officers have risen to the labors and problems confronting them pursuant to the sudden and large expansion of the navy, handicapped as they have been in the performance of their own particular duties by the necessity of training new personnel. The zeal, professional acumen, and tireless energy displayed in establishing and perfecting enlarged organizations under trying circumstances, incident to military demands on the one hand and to the unusual prevalence of communicable diseases on the other, are recognized with genuine satisfaction.

2. Nevertheless, before the advent of winter it is important to emphasize the necessity for unrelaxing vigilance on the part of all medical officers for the prevention of communicable diseases and for the perpetuation of such hygienic conditions as are known to protect against or to lessen predisposition to disease with a view toward a constantly reduced admission rate for communicable diseases and to the continued maintenance of the naval personnel in a state of the highest possible physical well being.

3. It is directed that thoughtful attention be given constantly to the details of advanced sanitation, and it is urged that sustained effort be made to correct or to have corrected locally by proper authority all sanitary defects which may be discovered. The bureau will be informed of all insanitary or unsatisfactory conditions, and it desires to be informed constantly as to means, methods, and measures which are or which may be, practicable for the correction or amelioration of undesirable conditions whenever and wherever they occur.

4. Frequent inspections are important and they should be made always with a view to constructive rather than destructive criticism. Inspections made by officers from outside of the particular organization inspected are of value because they call forth new ideas from fresh viewpoints and they should convey useful suggestions in connection with information relative to similar conditions and methods of dealing with similar situations in other places.

5. All officers through whose hands pass official letters or reports should be painstaking in the endeavor to clarify as much as possible each situation to which reference is made, by including in their indorsements an expression of opinion, either of concurrence or difference, and by writing in any facts within their knowledge which may pertain to the subject matter of the documents at hand. The unsatisfactory and noninforming word "Forwarded" should not be used alone when avoidable. Indorsements on reports which refer to insanitary or unsatisfactory conditions should include brief statements as to what appears to be necessary to correct the defects mentioned; what can be done, what, if anything, has been done, and what will be done at the station where the circumstances reported upon have occurred, to the end that the bureau may be in possession of all the facts necessary for its action, if action be indicated. The use of the word "Forwarded" without furher comment leads to a great deal of unnecessary correspondence.

6. Guided by a large experience with the problems presented in connection with the prevention and control of communicable diseases, the bureau recognizes the paramount importance of unfailing segregation of all recruits in detention at all camps and training stations for a period of 21 days before they are permitted to mingle with the main body. The ordinary mode of transmission of the common communicable diseases such as cerebro-spinal fever, diphtheria, measles, mumps, pneumonia, scarlet fever, and tonsillitis is by close contact, through the so-called "Droplet infection"—the contamination of contacts by the moist secretions of those already infected sprayed from the nose and throat in the act of talking, laughing, coughing, sneezing, spitting or snoring. The first principles of standard modern sanitation require that personal contact shall be reduced to a minimum in the housing of large bodies of men in barracks or camps, even though the men are apparently healthy.

7. If disease is present or if recruits are being received from districts where communicable diseases are prevalent emphasis must be placed upon the great importance of the early detection of cases, prompt isolation of patients, separation of the contacts of each type of disease in segregation for observation, and detention of all carriers in connection with such diseases as diphtheria, cerebro-spinal fever, malaria, and typhoid fever.

8. Apart from such considerations as sufficient floor area per individual and proper ventilation, the number of men housed in any one building or room should be small. Where large buildings have been occupied it has been necessary to abandon them after the advent of communicable diseases and to divide the men into smaller units. When large dormitories are fully occupied there must always be apprehension of danger.

9. In sleeping quarters, beds or cots should be placed or hammocks swung with not less than 5 feet between center lines. This is important. Overcrowding means close contact and close contact means the ready transference of nose and throat secretions. Therefore, individuals should be separated from each other always as far as practicable. The above figure is reasonable as it will give an aisle of 2½ feet between cots or hammocks and approximately 5 feet of space separating the heads of occupants. In the interest of disease prevention this distance might well be increased, but it should not be decreased without the strictest necessity.

10. The question of floor area is an important one. However, where the area per capita is limited and cannot be increased, or the number of occupants reduced, the arrangement of cots or hammocks should be such as will secure the maximum obtainable separation between the faces of the men while occupying them.

11. The minimum air space per individual should be 450 cubic feet to fulfill reasonably good hygienic requirements. In a ceiled room having 9 feet of height from floor to ceiling, 50 square feet of floor area are required to secure 450 cubic feet of space, the minimum requirement per individual. The important detail in the matter of floor area is that a safe distance between men must be provided (not less that 5 feet), therefore an area 8 by 5 feet is as good as an area 10 by 5 feet if the height of the room insures not less than 450 cubic feet of air space per capita. Each man must be provided with an adequate amount of fresh air in order to maintain a state of health and resistance to disease. This amount is not less than 3000 cubic feet per hour, obtained by proper ventilation. By this is meant not only the interchange of used and fresh air by up and down currents, but the constant movement of air in a horizontal direction as well. Air movement is necessary to personal comfort. There should be a minimum area of 24 square inches of fresh air inlet per individual. Inlets should be numerous and small rather than few and large. One inlet for every three persons is a proper proportion.

12. The simplest form of desirable inlet is that in which a pane of thick glass or other material is built into the lower inside frame of the window, resting on the sill and set in at an angle so that when the sash

is partially raised it will act as a baffle and direct the incoming air upward. Windows should permit opening at both top and bottom. Outlets in the roof of barracks (monitors) are highly desirable, and if the room or compartment be ceiled there should be openings in the ceiling. The area of outlets should be not less than one and one-half times greater than the area of inlets. Barracks should be protected from vermin and insects.

13. Medical officers are directed to exert themselves to the utmost for the prevention and early treatment of venereal diseases. There appears to have been doubt in the minds of some officers relative to their duty and responsibility in this connection. The subject was dealt with at length in a letter, February 27, 1915, from the Secretary of the Navy to all commanding officers. Paragraph 14 of that letter states specifically, "Nothing in the above is to be considered as minimizing or interfering in any way with the present authorized medical prophylactic measures which fill an important place in tending to limit these diseases. . . . ." A well-regulated system of prophylaxis or, "early treatment," is important, but it is recognized clearly that medical prophylactic treatment at best can only accomplish a limited amount of good, its effectiveness diminishing rapidly with increase in the number of hours elapsing between exposure and time of treatment. Much in the way of prevention can be and should be accomplished by thorough and systematic practice in teaching what has been termed moral and educational prophylaxis. Full use should be made of lectures, personal talks, and circulars. Copies of the advisory circular, Confidential Circular of Information No. 1 (Revised April, 1916), should be given freely to all men, particularly to recruits, and copies of Confidential Circulars, No. 2 (Original edition), No. 3 (Revised May, 1917), and No. 4 (Revised May, 1917), relating to the three venereal diseases, respectively, should be placed in the hands of all infected individuals. Revised copies of these circulars may be obtained from Naval Medical Supply Depots. In all cases of syphilis or syphilitic history the yellow abstract in the health record must be filled in accurately and entries must be made from time to time as occasion may indicate.

14. In the care and treatment of pneumonia, acute tonsillitis, and catarrhal infections of the respiratory tract it should be borne in mind that these are all communicable diseases which may be disseminated by droplet infection, that the secretions from the nose and throat are a source of danger to others so long as they remain moist, and that other patients should be protected from infection by their removal to a safe distance or by isolation of patients ill with communicable diseases of the respiratory tract. In suitable cases screens may be used to limit the projection of infective secretions.

15. Cooks and mess cooks have been agents for the dissemination of communicable diseases, and coming into intimate contact, as they do, with large numbers of men and the food for these men they must ever be regarded as potential sources of widespread infection.

16. In conclusion, medical officers are directed to keep constantly in touch with the bureau by means of frequent letters and reports of conditions as they occur from time to time; to be alert to discover promptly and to have corrected at the place of occurrence all remediable conditions. Apart from the information conveyed from the place or station of origin, reports have value in connection with reports of similar conditions in other places. Now that we have large units abroad and others at home widely separated but working coordinately it is particularly necessary to keep in close touch with the bureau. The increased difficulty of maintaining satisfactory health conditions during the winter and early spring should be kept in mind constantly and conditions which are likely to arise should be anticipated so far as may be possible. W. C. Braisted.—*Army and Navy Register*, 13/10.

NEW RATINGS IN THE NAVY.—The House on September 25 passed the bill (H. R. 5648) creating new ratings in the navy as follows:

Be it enacted, etc., That the ratings of engineman, first class, engineman, second class; blacksmith, first class, blacksmith, second class; coppersmith, first class, coppersmith, second class; pattern maker, first class, pattern maker, second class; molder, first class, molder, second class; chief special mechanic and special mechanic, first class, be, and they are hereby, established in the artificer branch of the navy with the following rates of base pay per month: Engineman, first class, $45; engineman, second class, $40; blacksmith, first class, $65; blacksmith, second class, $50; coppersmith, first class, $65; coppersmith, second class, $50; pattern maker, first class, $65; pattern maker, second class, $50; molder, first class, $65; molder, second class, $50; chief special mechanic, $127; special mechanic, first class, $80.—*Army and Navy Register.*

MEMBER OF "CAMPANA" GUNCREW IN GERMAN PRISON.—William A. Miller, the unaccounted for member of the naval guncrew of the American tank ship *Campana,* is in the German prison camp at Brandenburg with four other gunners previously reported there. The *Campana* was sunk August 6 after a gallant fight which she had to give up because her gunners had no more shells. As a result of that experience, the supply of ammunition on all armed ships was doubled.—*Shipping, 22/9.*

ENGINEERS COMMISSIONED.—Josephus Daniels, Secretary of the Navy, has authorized the commissioning of one hundred graduate electrical engineers as lieutenants, junior grade, in the Naval Reserve. That announcement was made yesterday by Thomas Robins, secretary of the Naval Consulting Board. He said Mr. Daniels had ordered that the one hundred lieutenants be provided as soon as possible, and that they would enter service immediately.

Detailed information and application blanks may be obtained at the Naval Consulting Board, the National Research Society and the American Institute of Electrical Engineers.—*N. Y. Herald,* 6/10.

ARMED STRENGTH OF THE UNITED STATES SEPTEMBER 6.—On the 6th day of September, 1917, there were in the regular army, national guard and reserve corps of the army 78,828 officers and 741,053 enlisted men. In the navy there were 141,867 enlisted men, 41,473 naval reserves, and 14,500 naval militia in the federal service. There were 5000 men in the coast guard and 6500 in the hospital corps; a total of 209,340. On this date the enlisted strength of the marine corps was 29,971; reserves in this service, 1070; national naval volunteers, 704; retired men on active duty, 14. There were approximately 12,000 officers in the navy and 1166 in the marine corps.

In other words, on this date the army had, including officers and enlisted men, 819,881 and the navy 254,265, a total armed strength on that date of 1,074,146 men, all of whom are volunteers. Prior to this time there was not a drafted soldier in a single training camp. The draft law was approved on the 18th day of May, 1917.

On September 6 the regular army was composed of 308,145 enlisted men and 7022 officers; the national guard of 377,421 enlisted men and 12,250 officers; the reserve corps of 55,487 enlisted men and 32,215 officers. There were also 27,341 officers turned out of the training camps.

Since war was declared 1,300,000 men have volunteered their services in one form or another for the defence of the country. Since April 6, 207,882 men have enlisted in the regular army and 214,419 in the national guard; 77,187 men have enlisted in the regular navy, 16,705 in the marine corps, and 31,473 in the naval reserve.

The following table, showing the strength of the navy and the army, authenticated by the committee on public information, will, it is believed, be interesting:

NAVY

	Strength on Apr. 6	Strength on Sept. 6	Increase since Apr. 6
Regular navy	64,680	141,867	77,187
Marine corps (enlisted)	13,266	29,971	16,705
Marine corps (officers)	426	1,166	740
Naval reserve	10,000	41,473	31,473
National naval volunteers	10,000	14,500	4,500
Hospital	2,000	6,500	4,500
Coast guard	.....	5,000	1,400
Reserves in service	.....	1,070	.....
National naval volunteers	.....	704	.....
Retired men on active duty	.....	14	14
Officers in navy	.....	12,000	.....

ARMY

	Strength on Apr. 6	Strength on Sept. 6	Increase since Apr. 6
Regular army (enlisted)	100,263	308,145	207,882
Regular army (officers)	7,022	7,022	.....
National guard (enlisted)	163,002	377,421	214,419
National guard (officers)	12,250	12,250	.....
Reserve corps (enlisted)	.....	55,487	.....
Reserve corps (officers)	.....	32,215	.....
Reserve corps (from training camps)	.....	27,341	27,341

ALLOWANCES, COMPENSATION AND INSURANCE.—The President on October 6 approved the act officially known as an amendment of the act establishing the Bureau of War Risk Insurance. As amended provision is made for family allowances, indemnification, re-education and insurance in behalf of officers and men in the military service of the United States.

It marks the enactment of the most important piece of legislation enacted during the recent session of the 65th Congress and it is doubtful if any other single act passed by Congress in its history will have the far-reaching effects of this law.

President Wilson has said: "What principally appeals to me about the bill is that it takes into consideration the whole obligation of the soldier not only, but the whole obligation of the government—the obligation of justice and humanity, both to the soldier and to his family. It is one of the most admirable pieces of legislation that has been proposed in connection with the war."

The movement for this legislation began with a protest against the arbitrary increases of insurance premiums by the insurance companies of this country, which has been described in these columns, and resulted in the administration measure designed to take care of and make full provision for men in the military service and their dependents.

The text of the act follows:

To amend an act entitled "An Act to authorize the establishment of a Bureau of War Risk Insurance in the Treasury Department," approved September 2, 1914, and for other purposes.

Be it enacted, etc., That the first section of the act entitled "An Act to authorize the establishment of a Bureau of War Risk Insurance in the Treasury Department," approved September 2, 1914, and for other purposes.

Be it enacted, etc., That the first section of the act entitled "An Act to authorize the establishment of a Bureau of War Risk Insurance in the Treasury Department," approved September 2, 1914, as amended, is hereby amended to read as follows:

"ARTICLE I

"Section 1. That there is established in the Treasury Department a bureau to be known as the Bureau of War Risk Insurance, the director of which shall receive a salary at the rate of $5000 per annum.

"That there be in such bureau a division of Marine and Seamen's Insurance and a division of Military and Naval Insurance in charge of a commissioner of Marine and Seamen's Insurance and a commissioner of Military and Naval Insurance, respectively, each of whom shall receive a salary of $4000 per annum.

"Sec. 2. That such Act of September 2, 1914, as amended, is hereby amended by adding new sections, as follows:

"Sec. 12. That sections two to seven, inclusive, and section nine, shall be construed to refer only to the division of Marine and Seamen's insurance.

"Sec. 13. That the director, subject to the general direction of the Secretary of the Treasury, shall administer, execute and enforce the provisions of this Act, and for that purpose have full power and authority to make rules and regulations, not inconsistent with the provisions of this Act, necessary or appropriate to carry out its purposes, and shall decide all questions arising under the Act, except as otherwise provided in sections five and four hundred and five. Wherever under any provision or provisions of the Act regulations are directed or authorized to be made, such regulations, unless the context otherwise requires, shall or may be made by the director, subject to the general direction of the Secretary of the Treasury. The director shall adopt reasonable and proper rules to govern the procedure of the divisions, to regulate the matter of the compensation, if any, but in no case to exceed 10 per centum, to be paid to claim agents and attorneys for services in connection with any of the matters provided for in articles two, three, or four, and to regulate and provide for the nature and extent of the proofs and evidence and the method of taking and furnishing the same in order to establish the rights to benefits of allowance, allotment, compensation, or insurance provided for in this Act, the forms of application of those claiming to be entitled to such benefits, the method of making investigations and medical examinations, and the manner and form of adjudications and awards.

"Sec. 14. That the bureau and its divisions shall have such deputies, assistants, actuaries, clerks and other employees as may be from time to time provided by Congress. The bureau shall, by arrangement with the Secretary of War and the Secretary of the Navy, respectively, make use of the services of surgeons in the Army and Navy. The Secretary of the Treasury is authorized to establish an advisory board consisting of three members skilled in the practice of insurance against death or disability for the purpose of assisting the Division of Military and Naval Insurance in fixing premium rates and in the adjustment of claims for losses under the contracts of insurance provided for in article four and in adjusting claims for compensation under article three; compensation for the persons so appointed to be determined by the Secretary of the Treasury, but not to exceed $20 a day each while actually employed.

"Sec. 15. That for the purposes of this Act the director, commissioners and deputy commissioners shall have power to issue subpœnas for and compel the attendance of witnesses within a radius of one hundred miles, to require the production of books, papers, documents and other evidence, to administer oaths and to examine witnesses upon any matter within the jurisdiction of the bureau. The director may obtain such information and such reports from officials and employees of the departments of the Government of the United States and of the States as may be agreed upon by the heads of the respective departments. In case of disobedience to a subpœna, the bureau may invoke the aid of any district court of the United States in requiring the attendance and testimony of witnesses and the production of documentary evidence, and such court, within the jurisdic-

tion of which the inquiry is carried on, may, in case of contumacy or refusal to obey a subpœna issued to any officer, agent, or employee of any corporation or other person, issue an order requiring such corporation or other person to appear before the bureau, or to give evidence to obey such order of the court may be punished by such court as a contempt thereof. Any person so required to attend as a witness shall be allowed and paid the same fees and mileage as are paid witnesses in the district courts of the United States.

"Sec. 16. That the director shall submit annually to the Secretary of the Treasury estimates of the appropriations necessary for the work of the bureau.

"Sec. 17. That for the purpose of carrying out the provisions of this Act there is hereby appropriated, out of any moneys in the Treasury not otherwise appropriated, the sum of $100,000, for the payment of all expenses incident to the work authorized under this Act, including salaries of the director and commissioners and of such deputies, assistants, accountants, experts, clerks and other employees in the District of Columbia or elsewhere, as the Secretary of the Treasury may deem necessary, traveling expenses, rent and equipment of offices, typewriters and exchange of same, purchase of law books and books of reference, printing and binding to be done at the Government Printing Office, and all other necessary expenses. With the exception of the director, the commissioners, and such special experts as the Secretary of the Treasury may from time to time find necessary for the conduct of the work of the bureau, all employees of the bureau shall be appointed from lists of eligibles to be supplied by the Civil Service Commission and in accordance with the civil-service law. Such fees, allowances and salaries shall be the same as are paid for similar services in other departments of the Government.

"Sec. 18. That there is hereby appropriated from any money in the Treasury not otherwise appropriated, the sum of $141,000,000, to be known as the military and naval compensation appropriation, for the payment of the family allowances provided by Article II. Payments out of this appropriation shall be made upon and in accordance with awards by the Commissioner of the Division of Military and Naval Insurance.

"Sec. 19. That there is hereby appropriated, from any money in the Treasury not otherwise appropriated, the sum of $12,150,000, to be known as the military and naval compensation appropriation, for the payment of the compensation, funeral expenses, services and supplies provided by Article III. Payments out of this appropriation shall be made upon and in accordance with awards by the director.

"Sec. 20. That there is hereby appropriated, from any money in the Treasury not otherwise appropriated, the sum of $23,000,000, to be known as the military and naval insurance appropriation. All premiums that may be collected for the insurance provided by the provisions of Article IV shall be deposited and covered into the Treasury to the credit of this appropriation.

"Such sum, including all premium payments, is hereby made available for the payment of the liabilities of the United States incurred under contracts of insurance made under the provisions of Article IV. Payments from this appropriation shall be made upon and in accordance with awards by the director.

"Sec. 21. That there shall be set aside as a separate fund in the Treasury, to be known as the military and naval pay deposit fund, all sums held out of pay as provided by section two hundred and three of this Act. Such fund, including all additions, is hereby made available for the payment of the sums so held and deposited, with interest, as provided in section two hundred and three, and the amount necessary to pay interest is hereby appropriated.

"Sec. 22. That for the purpose of this amendatory Act the marriage of the claimant to the person on account of whom the claim is made shall be shown—

"(1) By a duly verified copy of a public or church record; or

"(2) By the affidavit of the clergyman or magistrate who officiated; or

"(3) By the testimony of two or more eyewitnesses to the ceremony; or

"(4) By a duly verified copy of the church record of baptism of the children; or

"(5) By the testimony of two or more witnesses who know that the parties lived together as husband and wife, and were recognized as such, and who shall state how long, within their knowledge, such relation continued: Provided, That marriages, except such as are mentioned in section forty-seven hundred and five of the Revised Statutes, shall be proven in compensation or insurance cases to be legal marriages according to the law of the place where the parties resided at the time of marriage or at the time when the right to compensation or insurance accrued; and the open and notorious illicit cohabitation of a widow who is a claimant shall operate to terminate her right to compensation or insurance from the commencement of such cohabitation.

"Provided further, That for the purpose of the administration of Article II of this Act marriage shall be conclusively presumed, in the absence of proof, that there is a legal spouse living, if the man and woman have lived together in the openly acknowledged relation of husband and wife during the two years immediately preceding the date of the declaration of war, or the date of enlistment or of entrance into or employment in active service in the military or naval forces of the United States if subsequent to such declaration."

In Articles II, III and IV of this Act unless the context otherwise requires—

"(1) The term 'child' includes—

"(a) A legitimate child.

"(b) A child legally adopted more than six months before the enactment of this amendatory Act or before enlistment or entrance into or employment in active service in the military or naval forces of the United States, whichever of these dates is the later.

"(c) A stepchild, if a member of the man's household.

"(d) An illegitimate child, but, as to the father, only, if acknowledged by instrument in writing signed by him, or if he has been judicially ordered or decreed to contribute to such child's support, and if such child, if born after December 31, 1917, shall have been born in the United States, or in its insular possessions.

"(2) The term 'grandchild' means a child as above defined of a child as above defined.

"(3) Except as used in section four hundred and one and in section four hundred and two the terms 'child' and 'grandchild' are limited to unmarried persons either (a) under eighteen years of age, or (b) of any age, if insane, idiotic or otherwise permanently helpless.

"(4) The term 'parent' includes a father, mother, grandfather, grandmother, stepfather and stepmother, either of the person in the service or of the spouse.

"(5) The terms 'brother' and 'sister' include brothers and sisters of the half blood as well as those of the whole blood, stepbrothers and stepsisters, and brothers and sisters through adoption.

"(6) The term 'commissioned officer' includes a warrant officer, but includes only an officer in active service in the military or naval forces of the United States.

"(7) The terms 'man' and 'enlisted man' mean a person, whether male or female, and whether enlisted, enrolled, or drafted into active service in the military or naval forces of the United States, and include

noncommissioned and petty officers, and members of training camps authorized by law.

"(8) The term 'enlistment' includes voluntary enlistment, draft and enrollment in active service in the military or naval forces of the United States.

"(9) The term 'commissioner' means the Commissioner of Military and Naval Insurance.

"(10) The term 'injury' includes disease.

"(11) The term 'pay' means the pay for service in the United States according to grade and length of service, excluding all allowances.

"(12) The term 'military or naval forces' means the Army, the Navy, the Marine Corps, the Coast Guard, the Naval Reserves, the National Naval Volunteers, and any other branch of the United States service while serving pursuant to law with the Army or the Navy.

"Sec. 23. That when, by the terms of this amendatory Act, any payment is to be made to a minor, other than a person in the military or naval forces of the United States, or to a person mentally incompetent, such payment shall be made to the person who is constituted guardian or curator by the laws of the State or residence of claimant, or is otherwise legally vested with responsibility or care of the claimant.

"Sec. 24. That the Bureau of War Risk Insurance, so far as practicable, shall upon request furnish information to and act for persons in the military or naval service, with respect to any contracts of insurance, whether with the Government or otherwise, as may be prescribed by regulations. Said bureau may, upon request, procure from and keep a record of the amount and kind of insurance held by every commissioned and appointive officer and of every enlisted man in the military or naval service of the United States, including the name and principal place of business of the company, society or organization in which such insurance is held, the date of the policy, amount of premium, name and relationship of the beneficiary, and such other data as may be deemed of service in protecting the interests of the insured and beneficiaries.

"Sec. 25. That whoever in any claim for family allowance, compensation, or insurance, or in any document required by this Act or by regulation made under this Act, makes any statement of a material fact knowing it to be false, shall be guilty of perjury and shall be punished by a fine of not more than $5000, or by imprisonment for not more than two years, or both.

"Sec. 26. That if any person entitled to payment of family allowance or compensation under this Act, whose right to such payment under this Act ceases upon the happening of any contingency, thereafter fraudulently accepts any such payment, he shall be punished by a fine of not more than $2000, or by imprisonment for not more than one year, or both.

"ARTICLE II

"Allotments and Family Allowances

"Sec. 200. That the provisions of this article shall apply to all enlisted men in the military or naval forces of the United States.

"Sec. 201. That allotment of pay shall, subject to the conditions, limitations and exceptions hereinafter specified, be compulsory as to wife, a former wife divorced who has not remarried and to whom alimony has been decreed, and a child, and voluntary as to any other person; but on the written consent of the wife or former wife divorced, supported by evidence satisfactory to the bureau of her ability to support herself and the children in her custody, the allotment for her and for such children may be waived; and on the enlisted man's application, or otherwise for good cause shown, exemption from the allotment may be granted upon such conditions as may be prescribed by regulations.

"The monthly compulsory allotment shall be in an amount equal to the family allowance hereinafter specified except that it shall not be more than one-half the pay, or less than $15; but for a wife living separate and apart under court order or written agreement or for a former wife divorced, it shall not exceed the amount specified in the court order, decree, or written agreement to be paid to her. For an illegitimate child, to whose support the father has been judicially ordered or decreed to contribute, it shall not exceed the amount fixed in the order or decree.

"If there be an allotment for a wife or child, a former wife divorced and who has not remarried shall be entitled to a compulsory allotment only out of the difference, if any, between the allotment for the wife or child or both, and one-half of the pay.

"Sec. 202. That the enlisted man may allot any proportion or proportions or any fixed amount or amounts of his monthly pay or of the proportion thereof remaining after the compulsory allotment, for such purposes and for the benefit of such person or persons as he may direct, subject, however, to such conditions and limitations as may be prescribed under regulations to be made by the Secretary of War and the Secretary of the Navy, respectively.

"Sec. 203. That in case one-half of an enlisted man's monthly pay is not allotted, regulations to be made by the Secretary of War and the Secretary of the Navy, respectively, may require, under such circumstances and conditions as may be prescribed in such regulations, that any proportion of such one-half pay as is not allotted shall be deposited to his credit, to be held during such period of his service as may be prescribed. Such deposits shall bear interest at the rate of four per centum per annum, with semi-annual rests, and, when payable, shall be paid principal and interest to the enlisted man, if living, otherwise to any beneficiary or beneficiaries he may designate, or if there be no such beneficiary, then to the person or persons who would under the laws of the State of his residence be entitled to his personal property in case of intestacy.

"Sec. 204. That a family allowance of not exceeding $50 per month shall be granted and paid by the United States upon written application to the bureau by such enlisted man or by or on behalf of any prospective beneficiary, in accordance with and subject to the conditions, limitations and exceptions hereinafter specified.

"The family allowance shall be paid from the time of enlistment to death in or one month after discharge from the service, but not for more than one month after the termination of the present war emergency. No family allowance shall be made for any period preceding November 1, 1917. The payment shall be subject to such regulations as may be prescribed relative to cases of desertion and imprisonment and of missing men.

"Subject to the conditions, limitations, and exceptions hereinabove and hereinafter specified, the family allowance payable per month shall be as follows:

"Class A. In the case of a man, to his wife (including a former wife divorced) and to his child or children:

"(a) If there be a wife but no child, $15.

"(b) If there be a wife and one child, $25.

"(c) If there be a wife and two children, $32.50, with $5 per month additional for each additional child.

"(d) If there be no wife, but one child, $5.

"(e) If there be no wife, but two children, $12.50.

"(f) If there be no wife, but three children, $20.

"(g) If there be no wife, but four children, $30, with $5 per month additional for each additional child.

"Class B. In the case of a man or woman, to a grandchild, a parent, brother or sister:

"(a) If there be one parent, $10.

"(b) If there be two parents, $20.

"(c) For each grandchild, brother, sister and additional parent, $5.

"In the case of a woman, to a child or children:

"(d) If there be one child, $5.

"(e) If there be two children, $12.50.

"(f) If there be three children, $20.

"(g) If there be four children, $30, with $5 per month additional for each additional child.

"Sec. 205. That family allowances for members of Class A shall be paid only if and while a compulsory allotment is made to a member or members of such class. The monthly family allowance to a former wife divorced shall be payable only out of the difference, if any, between the monthly family allowance to the other members of Class A and the sum of $50, and only then if alimony shall have been decreed to her. For a wife living separate and apart under court order or written agreement or to a former wife divorced the monthly allowance, together with the allotment, if any, shall not exceed the amount specified in the court order, decree, or written agreement to be paid to her. For an illegitimate child, to whose support the family has been judicially ordered or decreed to contribute, it shall not exceed the amount fixed in the order of decree.

"Sec. 206. That family allowances to members of Class B shall be granted only if and while the member is dependent in whole or in part on the enlisted man, and then only if and while the enlisted man makes a monthly allotment of his pay for such member or members equal to the amount of the monthly family allowance as hereinbefore specified, except that—

"(a) The maximum monthly allotment so required to be made to members of Class B shall be one-half of his pay.

"(b) If he is making no allotment to a member of Class A, the minimum monthly allotment so designated to be made to members of Class B shall be $15 per month.

"(c) If he is making the compulsory allotment to a member of Class A, the minimum monthly allotment so designated to be made to members of Class B shall be one-seventh of his pay, but not less than $5 per month.

"On the enlisted man's application, or otherwise for good cause shown, exemption from this additional allotment under Class B as a condition to the allowance may be granted, upon such conditions as may be prescribed by regulations.

"Sec. 207. That the amount of the family allowance to members of Class B shall be subject to each of the following limitations:

"(a) If an allowance is paid to one or more beneficiaries of Class A, the total allowance to be paid to the beneficiaries of Class B shall not exceed the difference between the allowance paid to the beneficiaries of Class A and the sum of $50.

"(b) The total monthly allowance to beneficiaries of Class B added to the enlisted man's monthly allotment to them shall not exceed the average sum habitually contributed by him to their support monthly during the period of dependency but not exceeding a year immediately preceding his enlistment or the enactment of this amendatory Act.

"Sec. 208. That as between the members of Class A and as between the members of Class B, the amount of the allotment and family allowance shall be apportioned as may be prescribed by regulations.

"Sec. 209. The War and Navy Departments, respectively, shall pay over to the Treasury Department monthly the entire amount of such allotments for distribution to the beneficiaries, and the allotments and family allowances shall be paid by the bureau to or for the beneficiaries.

"Sec. 210. That upon receipt of any application for family allowance the commissioner shall make all proper investigations and shall make an award, on the basis of which award the amount of the allotments to be made by the man shall be certified to the War Department or Navy Department, as may be proper. Whenever the commissioner shall have

reason to believe that an allowance has been improperly made or that the conditions have changed, he shall investigate or reinvestigate and may modify the award. The amount of each monthly allotment and allowance shall be determined according to the conditions then existing.

"ARTICLE III

"Compensation for Death or Disability

"Sec. 300. That for death or disability resulting from personal injury suffered or disease contracted in the line of duty, by any commissioned officer or enlisted man or by any member of the Army Nurse Corps (female) or of the Navy Nurse Corps (female) when employed in the active service under the War Department or Navy Department, the United States shall pay compensation as hereinafter provided; but no compensation shall be paid if the injury or disease has been caused by his own willful misconduct.

"Sec. 301. That if death results from injury—if the deceased leave a widow, child, or if he leaves a widowed mother dependent upon him for support, the monthly compensation shall be the following amounts:

"(a) For a widow alone, $25.

"(b) For a widow and one child, $35.

"(c) For a widow and two children, $47.50, with $5 for each additional child up to two.

"(d) If there be no widow, then for one child, $20.

"(e) For two children, $30.

"(f) For three children, $40, with $5 for each additional child up to two.

"(g) For a widowed mother, $20. The amount payable under this subdivision shall not be greater than the sum which, when added to the total amount payable to the widow and children, does not exceed $75. This compensation shall be payable for the death of but one child, and no compensation for the death of a child shall be payable if such widowed mother is in receipt of compensation under the provisions of this article for the death of her husband. Such compensation shall be payable whether her widowhood arises before or after the death of the person and whenever her condition is such that if the person were living the widowed mother would have been dependent upon him for support.

"If the death occur before discharge or resignation from service, the United States shall pay for burial expenses and the return of body to his home a sum not to exceed $100, as may be fixed by regulations.

"The payment of compensation to a widow or widowed mother shall continue until her death or remarriage.

"The payment of compensation to or for a child shall continue until such child reaches the age of eighteen years or marries, or if such child be incapable, because of insanity, idiocy, or otherwise being permanently helpless, then during such incapacity.

"Whenever the compensation payable to or for the benefit of any person under the provisions of this section is terminated by the happening of the contingency upon which it is limited, the compensation thereafter for the remaining beneficiary or beneficiaries, if any, shall be the amount which would have been payable to them if they had been the sole original beneficiaries.

"As between the widow and the children not in her custody, and as between children, the amount of the compensation shall be apportioned as may be prescribed by regulations. The word 'widow' as used in this section shall not include one who shall have married the deceased later than ten years after the time of injury.

"Sec. 302. That if disability results from the injury—

"(1) If and while the disability is total the monthly compensation shall be the following amounts:

"(a) If he has neither wife nor child living, $30.

"(b) If he has a wife but no child living, $45.

"(c) If he has a wife and one child living, $55.

"(d) If he has a wife and two children living, $65.

"(e) If he has a wife and three or more children living, $75.

"(f) If he has no wife but one child living, $40, with $10 for each additional child up to two.

"(g) If he has a widowed mother dependent on him for support, then, in addition to the above amounts, $10.

"To an injured person who is totally disabled and in addition so helpless as to be in constant need of a nurse or attendant, such additional sum shall be paid, but not exceeding $20 per month, as the director may deem reasonable: Provided, however, That for the loss of both feet or both hands or both eyes, or for becoming totally blind or helplessly and permanently bedridden from causes occurring in the line of duty in the service of the United States, the rate of compensation shall be $100 per month: Provided further, That no allowance shall be made for nurse or attendant.

"(2) If and while the disability is partial, the monthly compensation shall be a percentage of the compensation that would be payable for his total disability, equal to the degree of the reduction in earning capacity resulting from the disability, but no compensation shall be payable for a reduction in earning capacity rated at less than ten per centum.

"A schedule or ratings of reductions in earning capacity from specific injuries or combinations of injuries of a permanent nature shall be adopted and applied by the bureau. Ratings may be as high as one hundred per centum. The ratings shall be based, as far as practicable, upon the average impairments of earning capacity resulting from such injuries in civil occupations and not upon the impairment in earning capacity in each individual case, so that there shall be no reduction in the rate of compensation for individual success in overcoming the handicap of a permanent injury. The bureau shall from time to time readjust this schedule of ratings in accordance with actual experience.

"(3) In addition to the compensation above provided, the injured person shall be furnished by the United States such reasonable governmental medical, surgical, and hospital services and with such supplies, including artificial limbs, trusses, and similar appliances, as the director may determine to be useful and reasonably necessary: Provided, That nothing in this act shall be construed to affect the necessary military control over any member of the military or naval establishments before he shall have been discharged from the military or naval service.

"(4) The amount of each monthly payment shall be determined according to the family condition then existing.

"Sec. 303. That every person applying for or in receipt of compensation for disability under the provisions of this article shall, as frequently and at such times and places as may be reasonably required, submit himself to examination by a medical officer of the United States or by a duly qualified physician designated or approved by the director. He may have a duly qualified physician designated and paid by him present to participate in such examination. For all examination he shall, in the discretion of the director, be paid his reasonable traveling and other expenses and also loss of wages incurred in order to submit to such examination. If he refuses to submit himself for, or in any way obstructs, any examination, his right to claim compensation under this article shall be suspended until such refusal or obstruction ceases. No compensation shall be payable while such refusal or obstruction continues, and no compensation shall be payable for the intervening period.

"Every person in receipt of compensation for disability shall submit to any reasonable medical or surgical treatment furnished by the bureau whenever requested by the bureau; and the consequences of unreasonable refusal to submit to any such treatment shall not be deemed to result from the injury compensated for.

"Sec. 304. That in cases of dismemberment, of injuries to sight or hearing, and of other injuries commonly causing permanent disability, the injured person shall follow such course or courses of rehabilitation, re-education, and vocational training as the United States may provide or procure to be provided. Should such course prevent the injured person from following a substantially gainful occupation while taking same, a form of enlistment may be required which shall bring the injured person into the military or naval service. Such enlistment shall entitle the person to full pay as during the last month of his active service, and his family to family allowances and allotment as hereinbefore provided, in lieu of all other compensation for the time being.

"In case of his willful failure properly to follow such course or so to enlist, payment of compensation shall be suspended until such willful failure ceases and no compensation shall be payable for the intervening period.

"Sec. 305. That upon its own motion or upon application the bureau may at any time review an award, and in accordance with the facts found upon such review, may end, diminish, or increase the compensation previously awarded, or if compensation has been refused or discontinued, may award compensation.

"Sec. 306. That no compensation shall be payable for death or disability which does not occur prior to or within one year after discharge or resignation from the service, except that where, after a medical examination made pursuant to regulations, at the time of discharge or resignation from the service, or within such reasonable time thereafter, not exceeding one year, as may be allowed by regulations, a certificate has been obtained from the director to the effect that the injured person at the time of his discharge or resignation was suffering from injury likely to result in death or disability, compensation shall be payable for death or disability, whenever occurring proximately resulting from such injury.

"Sec. 307. That compensation shall not be payable for death in the course of the service until the death be officially recorded in the department under which he may be serving. No compensation shall be payable for a period during which the man has been reported "missing" and a family allowance has been paid for him under the provisions of Article II.

"Sec. 308. That no compensation shall be payable for death inflicted as a lawful punishment for a crime or military offense except when inflicted by the enemy. A dismissal or dishonorable or bad conduct discharge from the service shall bar and terminate all right to any compensation under the provisions of this article.

"Sec. 309. That no compensation shall be payable unless a claim therefor be filed, in case of disability, within five years after discharge or resignation from the service, or, in case of death during the service, within five years after such death is officially recorded in the department under which he may be serving: Provided, however, That where compensation is payable for death or disability occurring after discharge or resignation from the service, claim must be made within five years after such death or the beginning of such disability.

"The time herein provided may be extended by the director not to exceed one year for good cause shown. If at the time that any right accrues to any person under the provisions of this article, such person is a minor, or is of unsound mind or physically unable to make a claim, the time herein provided shall not begin to run until such disability ceases.

"Sec. 310. That no compensation shall be payable for any period more than two years prior to the date of claim therefor, nor shall increased compensation be awarded to revert back more than one year prior to the date of claim therefor.

"Sec. 311. That compensation under this article shall not be assignable, and shall be exempt from attachment and execution and from all taxation.

"Sec. 312. That compensation under this article shall not be paid while the person is in receipt of service or retirement pay. The laws providing for gratuities or payments in the event of death in the service and existing pension laws shall not be applicable after the enactment of this amendment to persons now in or hereafter entering the military or naval service, or their widows, children, or their dependents, except in so far as rights under any such law shall have heretofore accrued.

"Compensation because of disability or death of members of the Army Nurse Corps (female) or of the Navy Nurse Corps (female) shall be in lieu of any compensation for such disability or death under the act entitled "An act to provide compensation for employees of the United States suffering injuries while in the performance of their duties, and for other purposes," approved September 7, 1916.

"Sec. 313. That if an injury or death for which compensation is payable under this amendatory act is caused under circumstances creating a legal liability upon some person other than the United States, or the enemy to pay damages therefor, the director, as a condition to payment of compensation by the United States, shall require the beneficiary to assign to the United States any right of action he may have to enforce such liability of such other person or any right which he may have to share in any money or other property received in satisfaction of such liability of such other person. The cause of action so assigned to the United States may be prosecuted or compromised by the director and any money realized thereon shall be placed to the credit of the compensation fund.

"Sec. 314. That from and after the passage of this act the rate of pension for a widow of an officer or enlisted man of the Army, Navy or Marine Corps of the United States who served in the Civil War, the war with Spain, or the Philippine Insurrection, now on the pension roll or hereafter to be placed on the pension roll, and entitled to receive a higher rate than hereinafter provided, shall be $25 per month; and nothing herein shall be construed to affect the additional allowance provided by existing pension laws on account of a helpless child or child under sixteen years of age: Provided, however, That this act shall not be so construed as to reduce any pension under any act, public or private: And provided further, That the provisions of this section shall be administered, executed, and enforced by the commissioner of pensions.

"ARTICLE IV

"*Insurance*

"Sec. 400. That in order to give to every commissioned officer and enlisted man and to every member of the Army Nurse Corps (female) and of the Navy Nurse Corps (female) when employed in active service under the War Department or Navy Department greater protection for themselves and their dependents than is provided in Article III, the United States, upon application to the bureau and without medical examination, shall grant insurance against the death or total permanent disability of any such person in any multiple of $500, and not less than $1,000 or more than $10,000, upon the payment of the premiums as hereinafter provided.

"Sec. 401. That such insurance must be applied for within one hundred and twenty days after enlistment or after entrance into or employment in the active service and before discharge or resignation except that those persons who are in the active war service at the time of the publication of the terms and conditions of such contract of insurance may apply at any time within one hundred and twenty days thereafter and while in such service. Any person in the active service on or after the sixth day of April, 1917, who, while in such service and before the expiration of one hundred and twenty days from and after such publication, becomes or has become totally and permanently disabled or dies, or has died, without having applied for insurance, shall be deemed to have applied for and to

have been granted insurance, payable to such person during his life in monthly installments of $25 each. If he shall die either before he shall have received any such monthly installments or before he shall have received two hundred and forty of such monthly instalments, then $25 per month shall be paid to his wife from the time of his death and during her widowhood, or to his child, or widowed mother, if any, while they survive him: Provided, however, That not more than two hundred and forty of said monthly installments, including those received by such person during his total and permanent disability, shall be so paid; and in that event the amount of the monthly installment shall be apportioned between them as may be provided by regulations.

"Sec. 402. That the director, subject to the general direction of the Secretary of the Treasury, shall promptly determine upon and publish the full and exact terms and conditions of such contract of insurance. The insurance shall not be assignable, and shall not be subject to the claims of creditors of the insured or of the beneficiary. It shall be payable only to a spouse, child, grandchild, parent, brother or sister, and also during total and permanent disability to the injured person, or to any or all of them. The insurance shall be payable in two hundred and forty equal monthly installments. Provisions for maturity at certain ages, for continuous installments during the life of the insured or beneficiaries, or both, for cash, loan, paid-up and extended values, dividends from gains and savings, and such other provisions for the protection and advantage of and for alternative benefits to the insured and the beneficiaries as may be found to be reasonable and practicable, may be provided for in the contract of insurance, or from time to time by regulations. All calculations shall be based upon the American Experience Table of Mortality and interest at three and one-half per centum per annum, except that no deduction shall be made for continuous installments during the life of the insured in case his total and permanent disability continues more than two hundred and forty months. Subject to regulations, the insured shall at all times have the right to change the beneficiary or beneficiaries of such insurance without the consent of such person or persons, within the permitted class or classes herein provided. If no beneficiary within the permitted class be designated by the insured, either in his lifetime or by his last will and testament, or if designated beneficiary does not survive the insured, the insurance shall be payable to such person or persons, within the permitted class of beneficiaries as would under the law of the States of the residence of the insured, be entitled to his personal property in case of intestacy. If no such person survive the insured, then there shall be paid to the estate of the insured an amount equal to the reserve value, if any, of the insurance at the time of his death, calculated on the basis of the American Experience Table of Mortality and three and one-half per centum interest in full of all obligations under the contract of insurance.

"Sec. 403. That the United States shall bear the expenses of administration and the excess mortality and disability cost resulting from the hazards of war. The premium rates shall be the net rates based upon the American Experience Table of Mortality and interest at three and one-half per centum per annum.

"Sec. 404. That during the period of war and thereafter until converted the insurance shall be term insurance for successive terms of one year each. Not later than five years after the date of the termination of the war as declared by proclamation of the President of the United States, the term insurance shall be converted, without medical examination, into such form or forms of insurance as may be prescribed by regulations and as the insured may request. Regulations shall provide for the right to convert into ordinary life, 20-payment life, endowment maturing at age 62, and into other usual forms of insurance and shall prescribe the time and method of payment of the premiums thereon, but payments of premiums

in advance shall not be required for periods of more than one month each and may be deducted from the pay or deposit of the insured or be otherwise made at his election.

"Sec. 405. That in the event of disagreement as to a claim under the contract of insurance between the bureau and any beneficiary or beneficiaries thereunder, an action on the claim may be brought against the United States in the district court of the United States in and for the district in which such beneficiaries or any of them reside. The court, as part of its judgement, shall determine and allow such reasonable attorney's fees, not to exceed ten per centum of the amount recovered, to be paid by the claimant on behalf of whom such proceedings are instituted to his attorney; and it shall be unlawful for the attorney or for any other person acting as claim agent or otherwise to ask for, contract for, or receive any other compensation because of such action. No other compensation or fee shall be charged or received by any person except as may be authorized by the commissioner in regulations to be promulgated by him. Any person violating the provisions of this section shall be deemed guilty of a misdemeanor, and upon conviction thereof shall, for each and every such offense, be fined not exceeding $500, or be imprisoned at hard labor not exceeding two years, or both, in the discretion of the court.

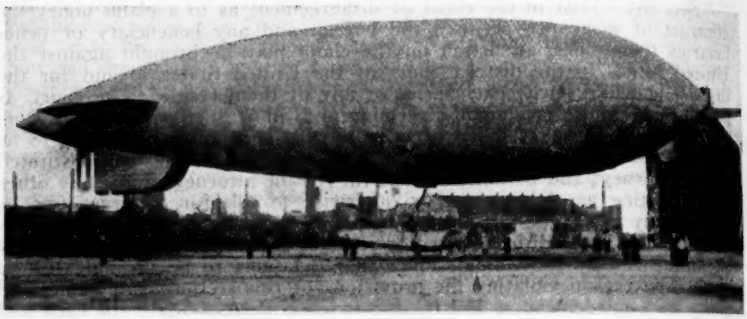
"Sec. 3. That section eight of the act entitled 'An act to authorize the President to increase temporarily the Military Establishment of the United States,' approved May 18, 1917, shall be held and construed to authorize the President, in accordance with the provisions of said act and for the period of the existing emergency only, to appoint as generals the chief of staff and the commander of the United States forces in France; and as lieutenant general each commander of an Army or Army corps organized as authorized by existing law: Provided, That the pay of the grades of general and lieutenant general shall be $10,000 and $9000 a year, respectively, with allowances appropriate to said grades as determined by the Secretary of War: And provided, that brigadier generals of the Army shall hereafter rank relatively with rear admirals of the lower half of the grade. And, hereafter, the chief of any existing staff corps, department, or bureau, except as is otherwise provided for the chief of staff, shall have the rank, pay, and allowances of major general."—*Army and Navy Register*, 13/10.

WHAT INSURANCE WILL COST ACCORDING TO AGE AND AMOUNT OF POLICY

Age	Amount of policy											
	$1000	$1500	$2000	$2500	$3000	$4000	$5000	$6000	$7000	$8000	$9000	$10,000
21	$0.65	$0.98	$1.30	$1.63	$1.95	$2.60	$3.25	$3.90	$4.55	$5.20	$5.85	$6.50
22	0.65	0.98	1.30	1.63	1.95	2.60	3.25	3.90	4.55	5.20	5.85	6.50
23	0.65	0.98	1.30	1.63	1.95	2.60	3.25	3.90	4.55	5.20	5.85	6.50
24	0.66	0.99	1.32	1.65	1.98	2.64	3.30	3.96	4.62	5.28	5.94	6.60
25	0.66	0.99	1.32	1.65	1.98	2.64	3.30	3.96	4.62	5.28	5.94	6.60
26	0.67	1.01	1.34	1.68	2.01	2.68	3.35	4.02	4.69	5.36	6.03	6.70
27	0.67	1.01	1.34	1.68	2.01	2.68	3.35	4.02	4.69	5.36	6.03	6.70
28	0.68	1.02	1.36	1.70	2.04	2.72	3.40	4.08	4.76	5.44	6.12	6.80
29	0.69	1.04	1.38	1.73	2.07	2.76	3.45	4.14	4.83	5.52	6.21	6.90
30	0.69	1.04	1.38	1.73	2.07	2.76	3.45	4.14	4.83	5.52	6.21	6.90
35	0.74	1.11	1.48	1.85	2.22	2.96	3.70	4.44	5.18	5.92	6.66	7.40
40	0.81	1.22	1.62	2.03	2.43	3.24	4.05	5.52	6.44	7.36	8.28	9.20
45	0.92	1.38	1.84	2.30	2.76	3.68	4.60	....	....	....	....	....

The amounts stated are monthly premiums to be paid.—*N. Y. Herald*, 15/10.

AERONAUTICS



ONE OF THE GOODRICH COAST PATROL TYPE DIRIGIBLES BUILT FOR THE NAVY BY THE GOODRICH COMPANY. (Passed by the Censor)

U. S. AIRCRAFT BOARD CREATED.—The bill which passed the Senate on September 12 and the House of Representatives on September 26, reads as follows:

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That for the purpose of expanding and coordinating the industrial activities relating to aircraft, or parts of aircraft, produced for any purpose in the United States, and to facilitate generally the development of air service, a board is hereby created, to be known as the Aircraft Board, hereinafter referred to as the board.

"Sec. 2. That the board shall number not more than nine in all, and shall include a civilian chairman, the chief signal officer of the army, and two other officers of the army, to be appointed by the Secretary of War; the chief constructor of the navy and two other officers of the navy, to be appointed by the Secretary of the Navy; and two additional civilian members. The chairman and civilian members shall be appointed by the President, by and with the advice and consent of the Senate.

"Sec. 3. That said board and tenure of office of the members thereof shall continue during the pleasure of the President, but not longer than six months after the present war. The civilian members of the board shall serve without compensation.

"Sec. 4. That the board is hereby empowered, under the direction and control of and as authorized by the Secretary of War and the Secretary of the Navy, respectively, on behalf of the Departments of War and Navy, to supervise and direct, in accordance with the requirements prescribed or approved by the respective departments, the purchase, production, and manufacture of aircraft, engines, and all ordnance and instruments used in connection therewith, and accessories and materials therefor, including the purchase, lease, acquisition, or construction of plants for the manufacture of aircraft, engines, and accessories: Provided, That the board may make recommendations as to contracts and their distribution in connection with the foregoing, but every contract shall be made by the already constituted authorities of the respective departments.

"Sec. 5. That the board is also empowered to employ either in the District of Columbia or elsewhere, such clerks and other employees as may be necessary to the conduct of its business, including such technical experts and advisers as may be found necessary, and to fix their salaries. Such salaries shall conform to those usually paid by the government for similar service: Provided, That by unanimous approval of the board

higher compensation may be paid to technical experts and advisers. The board may rent suitable offices in the District of Columbia or elsewhere, purchase necessary office equipment and supplies, including scientific publications and printing, and may incur necessary administrative and contingent expenses, and for all the expenses enumerated in this paragraph there shall be allotted by the chief signal officer of the army for the fiscal year nineteen hundred and seventeen and nineteen hundred and eighteen the sum of $100,000, or so much thereof as shall be necessary, from any appropriation now existing for or hereinafter made to the signal corps of the army, and such appropriation is hereby made available for these purposes: Provided further, That except upon the joint and concurrent approval of the Secretary of War and the Secretary of the Navy there shall not be established or maintained under the board any office or organization duplicating or replacing, in whole or in part, any office or organization now existing that can be properly established or maintained by appropriations made for or available for the military or naval services."—*Flying*, October.

AEROPLANES UNDER CONSTRUCTION.—The following statement made by the Secretary of War was published in the *New York Times*, October 5:

"The development of the 'Liberty Motor' is being followed by highly satisfactory progress in the equipment of the aerial branch of the army and the training of its aviators. While it is inexpedient to impart information of military value or to detail strategic plans, it is felt that a partial announcement may be made of the progress of the aviation program. This statement is to meet numerous requests of the press and to convey to the country an authentic report of the work of the aviation section. The aviation situation to-day may be summarized as follows:

"Contracts have been let and work is in progress on practically the entire number of airplanes and motors for which provision was made in the $640,000,000 aviation bill passed by Congress in July. This program called for more than 20,000 airplanes.

"The types of airplanes now in process of manufacture cover the entire range of training machines, light high-speed fighting machines, and powerful battle and bombing planes of the heaviest design. Our contracts call for an ample number of training machines, and embrace as well giant battle planes capable of the work of the Caproni, the Handley Page, and similar types.

"Every measure of insurance has been taken that the American forces in France shall be amply equipped with aircraft. The work of the aviation section has been thoroughly systematized. The training of aviators, the building of motors, and the construction of wings is proceeding uniformly—each keeping pace with the other and with general war plans.

"The comprehensive plan is that when motors are ready there shall be ready also the planes necessary; and when the motors and planes are ready aviators and machine guns shall be available. Coordination has been developed in every branch of the aviation section.

"Within a reasonable time, considering the period for preparation, this country will send its first airplane to Europe. This airplane, from the tip of its propellers to the engine, machine gun, and camera, will have been made in the United States.

"It has been necessary greatly to develop and expand the aircraft industry in this country. This work of increasing the output of existing manufacturing establishments, creating new plants, and providing tool, gauge, and jig equipment for great quantity production, has required time, and the months of the summer have been, and the early fall will be, devoted to this essential ground work.

"United States airplanes are being constructed both in this country and abroad. Approximately one-fourth of the number soon needed will be made abroad.

"Provision has been made also for the manufacture of the many accessories necessary to aircraft service at the front. Sources of supply for machine guns, observation apparatus, cameras, scientific instruments of navigation and precision, and many other specialities of the aircraft art have been provided. Both in this country and abroad this work has been under direction of skilled men.

"The designing of the 'Liberty Motor,' previously referred to by the Secretary of War as probably the greatest single achievement of the war, has been accorded foreign recognition. Our allies have already asked for samples of these motors and are investigating the possibilities of quantity production in this country.

"The United States to-day is in practical control of many of the materials required for the manufacture of aircraft, both for this government and its allies. Steps have been taken for the conservation and distribution of such materials and the great resources of this country.

"Under the direction of the Aircraft Production Board there is being accomplished an international standardization in the tests of materials and their specifications, so that through a unification of the demands upon this country there may be full utility of our resources.

"If the operations of the land forces of the country are directed by a General Staff, the aviation service may lay claim to an 'International General Staff.' More than 30 of the air service experts of the allied nations have come to Washington, and are on regular duty with the officers of the army and navy air services and with the members of the Aircraft Production Board. The best men of the air services of the allied countries have been loaned to this government, and were sent here to aid in getting our aviation program under way with the fewest possible mistakes and the greatest economy in time.

"There has been a remarkably gratifying response to the call for aviators. This country has an unlimited supply of young men possessing courage, self-reliance, good judgment and decision—the things required in the air service. This service, appealing to both the imagination and patriotism of such young men, is to-day fitting thousands of Americans for flying.

"The ground schools conducted by several of our great universities are turning out cadets steadily. Twenty-four flying schools have been authorized and construction work is up to schedule.

"Realizing there would be a shortage in the beginning of American-built training planes, a successful substitute plan was evolved. Arrangement was made with the allied countries for the acceptance of our cadet students for final training upon foreign soil. These men are being trained in our uniforms and will be turned over as finished aviators to the fighting forces in France.

"American aviators are to-day in training in all the allied countries. They are now undergoing intensive training behind several of the battle-fronts. The sending of great numbers of American aviators abroad, and the rapidity of training preparations at the flying schools in the United States—such as the one near Dayton—indicate the scope of the work of the aviation section since funds were made available for an army of aviators.

"There is practically no limit to the number of aerial fighters which the United States can, and will, furnish in the war for democracy. No time has been lost in experiments. The machines which have already proved successful will be reproduced in large numbers in this country. Through negotiations consummated through the Aircraft Board there has been established the principle of the free interchange of manufacturing and patent rights. There exists to-day the closest cooperation among the allied nations in sending a great aerial fleet above the battlefronts. When this nation's army moves up to participate in the fighting the eyes of her army will be ready.

"The signal corps and its staff of foreign advisers are well satisfied with the progress made since the designing of the 'Liberty Motor.' It is not possible to make public the details of the work accomplished. The War Department can only say that its earlier expectations and hopes for the consummation of our extensive aircraft program are being more than realized."—*N. Y. Times*, 5/10.

THE AMERICAN AVIATION PROGRAM.—The following article by T. F. Farman appeared in the October issue of *The Contemporary Review*:

"The large total of $640,000,000 provided for the construction of aeroplanes and the training of the necessary pilots, observers, mechanics, etc., shows that, though the American aviation services have to be created from top to bottom, the determination of our new allies to carry out their huge program is most serious. They have already set to work with a will to execute it. And, it is important to note, it has been stated on reliable authority that the machines are to be of the most approved British and French types. The Americans have had enough common sense to recognize that the avions built, thus far, by their constructors are not fit for war purposes. They have consequently invited the British and French aviation authorities to assist them, not only by furnishing them with the plans and specifications of their machines, but by instructing them in all matters concerning the organization of their aviation services.

"When, immediately after the declaration of war by the United States, it was announced that America would construct an immense aerial fleet, Orville Wright said: 'I do not believe the war can be ended by any other method with so little loss of life and property.' He was probably right, and though the number of aeroplanes to be built is only 22,000 instead of the 100,000 first spoken of, his assertion loses none of its weight. Every day the war has lasted has served to demonstrate to the British and French the indispensable character of the avion in modern warfare, and the decision now taken by the Americans to send a formidable aerial force to Europe, can but act as an additional stimulus to them to make yet more strenuous efforts to secure that mastery in the air which is an all-important factor of superiority on the earth. The Entente Powers will therefore continue to increase and strengthen their aerial forces which, with the addition of the avions the Americans will furnish, should insure the retention of that superiority in the air which has been already wrested from the Germans. The Germans, however, in the hope of regaining it, have, it is affirmed, abandoned altogether the building of Zeppelins and converted Friedrichshafen into a great aeroplane factory. But, in spite of all the efforts the Germans may make to augment their aerial fleet, our superiority should be rendered sufficiently complete to blind the enemy's artillery, and at the same time keep the eyes of the British, French and American commanders wide open; that is to say, the aerial forces of the Entente Powers should be strong enough to beat back, capture, or destroy every hostile aeroplane seeking to penetrate over their lines, to reconnoiter and discover the positions of batteries, fortified places, troops, etc., and to make incursion over the territory occupied by the foe to learn his military secrets a comparatively easy matter.

"To reconnoiter and direct the fire of artillery are two indispensable services rendered by aeroplanes, but they have made their action felt in many other ways. They have bombarded with good effect munitions depots and factories, fortified places, camps, etc. They have flown far over the enemy's territory, and it is only natural to anticipate that, with the addition of the American aerial contingent, and the ever-increasing importance of the British and French aerial forces, those journeys will ere long be effected with still larger fleets. The assistance in aerial warfare the Americans can render the Entente Powers is therefore most valuable, and their intention to do their utmost to give it is unquestionable. The voting of the big aviation grant is no bluff, but the task they have under-

taken will probably prove more difficult to perform than they imagine even now. Admitting that it is possible for them, with their powerful industrial organizations, to construct the 22,000 aeroplanes, as they hope to do, by the end of June, 1918, in spite of the inevitable delays resulting from the modifications which future experience in the war will render advisable and even indispensable, and that the necessary motors suitable for the various types of avions can be provided within the time-limit, there still remains the difficult and delicate task of training the great number of pilots who will be required. The aerodromes for their instruction have to be created, the machines on which the pupils will have to practice flight do not yet exist in anything like sufficient numbers, and the professors have to be found. The 'output' of pilots, if that expression be permissible in speaking of such brave men, would have to be 100 per week to provide 5200 pilots in 12 months. If the Americans succeed in making that number of really skilled pilots within that period of a year, the result will be most brilliant, especially as in the first months they cannot terminate the training of one single man.

"The French employ a method of selection from among the volunteers for service as pilots in the aviation corps. It was invented by Doctors Camus and Nepper. It consists in tests of the applicant's physical aptitudes. With the aid of ingenious instruments the candidate's nervous reactions are mechanically inscribed. In war the safety of the pilot and the success of his mission must often depend on rapidity of action. A fraction of a second between the perception of a sound, the instant when an object is perceived or a shock felt, and the requisite action to avert the danger is often of vital importance. Doctors Camus and Nepper have succeeded in measuring that lapse of time which, for military aviators, should be but a small fraction of a second. The same doctors, knowing that a military aviator has not only to pilot his machine safely, but also to fight, have invented an apparatus to ascertain his emotional reactions. The instrument inscribes the applicant's sang-froid, or his lack of that quality. The application of those tests has proved very useful for the elimination of candidates physically unfit for service in the aviation corps as pilots. Doctors Camus and Nepper do not pretend that every man who undergoes the tests successfully will make a good military aviation pilot, but they contend that those men who fail to pass are physically unfit for such service. By adopting this or some similar test, the Americans would avoid great loss of time in the training of aviation pupils who, after considerable training, might be found physically incapable of performing the work required of them. There is, however, a physical aptitude indispensable for a good military aviation pilot to test which no apparatus has yet been invented. It is the ability to ascend to a high altitude without feeling emotion calculated to diminish the pilot's capacities. It is not a question of the strength or weakness of the heart, which can, of course, be easily ascertained. At the beginning of the war the military aviators rarely ascended higher than 600 or 1000 meters (1968 or 3280 feet). At the present time battles in the air are frequently fought at altitudes varying between 3000 and 4000 meters (9840 and 13,120 feet). Many aviators who are in possession of all their faculties while flying at the height of 1000 or even 2000 meters (3280 or 6560 feet) cannot ascend to a greater altitude without losing their self-possession.

"That being said, it is useful to indicate what the huge American aviation program really means. 'The man-in-the-street' seems to imagine that immense fleets of thousands of American aeroplanes will soon be seen flying over Germany, bombarding the Krupp factory at Essen, Berlin, and the other capitals of the German states. Undoubtedly such expeditions will be undertaken by the Entente Allies with more important aerial forces, and more frequently than heretofore; but it must be remembered that the Americans cannot, even with the complete execution of their aviation program, ever have at the same time anything approaching 22,000

avions in service. Though money has been spent lavishly on the creation and organization of the British and French aviation services, it is not divulging any secret to say that the two nations have never had so many avions fit for military and naval operations in their possession. The average length of life of a military aeroplane in active service is not more than four months; therefore, to maintain a fleet of 22,000 avions at the front, the construction of 66,000 a year would be necessary. As the American grant provides for the building of only 22,000 within the next 12 months, and as the machines will be put into service gradually, it must be taken for granted that the very largest number which can be in service at the same time will be between 7000 and 10,000. And it does not at all follow that all those machines will be available altogether for reconnoitering, bombarding, etc. On the contrary, each pilot should have at his disposal two avions. If he has only one, half his time and probably more will be spent in doing nothing during the repair of his avion or its motor. Consequently, it would seem a liberal estimate to reckon that the construction of 22,000 aeroplanes could at no moment of the year furnish an aerial reconnoitering and fighting force of more than 5000, especially as in both the British and French aviation services two aeroplanes per pilot are not considered sufficient. Under these circumstances it is agreeable to note the declarations of General Squiers in charge of the execution of the American aviation program. He says it is no secret that the $640,000,000 voted for the creation of the American aviation services 'is only the forerunner of another grant equally big.' It is certain that to maintain even 5000 avions working at the front it will be necessary for the Americans to build at least three times that number per annum. That will no doubt be attempted, and perhaps achieved. At any rate, General Squiers's conception of the mission confided to him would lead the world to think so. He says: 'The conception I have of my duty is not only to launch an attack by way of the air, but to create a veritable inundation of aeroplanes.' We intend to furnish the 'cavalry of the sky,' which will contribute to the final victory.' On his side Mr. Howard Coffin, President of the American Aviation Commission, knows very well 'the building of aeroplanes is not like shaking leaves from a tree.' Referring to the training of the necessary number of pilots, he adds: 'Already three of our twenty-four great training-grounds for aviators are ready, and on those grounds training has begun. . . . . My fellow countrymen have given us money and men; let our allies give us confidence and credit.'

"The addition of 5000 American avions to the ever-increasingly large number of military and naval aeroplanes possessed by Great Britain and France would constitute an extremely valuable reinforcement of the Entente Powers' aerial forces, though it would not have that overwhelmingly powerful character which too many people appear to imagine. The Germans are thoroughly alive to the vital importance of aeroplanes in the present conflict, and in presence of the strenuous efforts they are making to regain supremacy in the air by the construction of such powerful aerial craft as the Gotha, propelled by two 250 horsepower engines, and armed with four *mitrailleuses*, nothing could indicate more clearly the immense services the Americans can render their allies than the following extract from a German official document, found in possession of a prisoner. It is the general report of the battle of the Somme, drawn up by the staff of General von Bellow, commander of the First German Army, which had to bear the brunt of the battle and which suffered such severe losses:

"Our aviators were very seldom able to execute long-distance reconnoitering expeditions. Our artillery aviators were driven back as soon as they attempted to cross the enemy's lines to regulate the fire of our batteries. Reconnoitering by photography did not furnish the indications demanded of it. The consequence was that, often at decisive moments, our infantry could not obtain support from our artillery, either by counteraction against the enemy's artillery, or by an annihilating fire on the

hostile infantry awaiting the word of command to attack. Our artillery suffered serious losses in its personnel and matériel from the enemy's artillery, of which the fire was regulated by perfect aerial observations, without ours being able to engage in the struggle. During the attacks our infantry and artillery were, moreover, exposed to the attacks of the hostile aviators, and the moral effect resulting from it was undeniable. One of the causes of that inferiority was the limited number of our aviators, which was in the proportion of one to ten. Moreover, they could not be effectually supported by our anti-aircraft guns, of which the small number was diminished by the great losses in material caused by the Anglo-French artillery fire, and by the wearing out of the tubes, resulting from abnormal service. And we possessed no telephonic aerial defence, so that the arrival of the enemy's aviators was always announced too late. Lastly, our fighting aerial squadrons were stationed too far in the rear, and some of them were provided with C machines, which are, so to say, unfit for aerial battle.'

"This long general report of the great battle concludes with the well-founded assertion: "Nothing but the presence, in useful time, of a great aerial force can insure success.'

"That the Germans have profited by the lessons thus taught them in 1916 is demonstrated by the now frequent use of groups of fighting avions, superior both in numbers and armament to those formerly employed, to support the attacking waves of infantry by flying low and firing on their enemies. Without neglecting the primary duties of the aerial services, those of reconnoitering and regulating the fire of artillery, our enemies are every day extending more and more the employment of aeroplanes in conjunction with the other arms. To counter such combined attacks, and to organize similar combined action against the foe, all the aid the Americans can furnish will not be more than will be required, because the sooner the Germans are thoroughly mastered in the air, the sooner the land forces of the Entente Powers will be able to impose their mastery over them on the earth.

"The struggle for that mastery between the Entente Powers and the Central Empires will therefore increase in intensity. The genius of inventors in both groups of nations, will continue to be enlisted to produce more and more powerful machines of various types, each better adapted to the services it is intended to render than the aeroplanes employed to-day. It is consequently not only a question of quantity but one of quality. A great deal has been said about the advisability of unifying the aeroplanes in use in the armies of the Entente Powers, in order that the spare parts of one machine may serve for another. Something has been done in that way; but the spare parts of a big, bombarding aeroplane cannot be made to fit a swift, fighting one. However, with the object of obtaining as great uniformity as possible, the Americans have adopted the metric system of weights and measures for the building of their aircraft and their motors, all of which—that is to say, both the flying apparatuses and the engines, are to be copies of the most approved types in use in the British and French armies.

"The aeroplane and the submarine are the two new factors revolutionizing warfare on land and sea. In this connection it is interesting and important to note that if the submarine is powerless against the seaplane, the seaplane can be employed with good effect against the submarine. It can discover the whereabouts of the submarine much more easily than any surface craft. Flying at the height of 100 or 200 meters (328 or 656 feet) it can, in a fairly calm sea, descry the vessel even when it is navigating at a considerable depth, and failing favorable weather, it can detect the wake the submarine leaves on the surface of the water. It can swoop down on the enemy and attack it with bombs regulated to explode at a given depth. If the submarine is navigating on the surface, its destruction by the hydroplane is all the less difficult. In any case, having

discovered the presence of a submarine, the hydroplane can promptly warn the merchant vessels in the vicinity to be on their guard, and, if necessary, to alter their course.

"No one need feel disappointment because the Americans cannot hope to maintain in actual service in Europe an aerial fleet of more than 5000 aeroplanes during the coming year. That number, or even half of it, with the increased power of the British and French aviation corps, would almost certainly place the enemy's aerial forces in a position of marked inferiority. It would be something like a miracle if the Germans could keep pace with Great Britain, France, and the United States in building aircraft and training pilots, especially as the wastage of their machines, and the casualties among their pilots have for many months been greater than the losses suffered by the Entente Powers. It is therefore not unreasonable to expect that the arrival of the American aeroplanes on the western front will result in the three great allies obtaining a sufficiently complete mastery in the air to enable them most materially to hasten a decisive victory.

"Formidable battles between fleets of avions will nevertheless have to be fought, but the bombardment of the enemy's camps, etc., in the rear of the fighting lines, will be effected on a much larger scale than heretofore. The wrecking of munitions factories, far in the interior of Germany, by means of bombs dropped by imposing fleets of avions, will make the Germans feel that, if their territory is not yet invaded by land forces, war is carried into it in a very effectual manner. That warfare, directed against places of military importance, will inevitably result in the unintentional killing and wounding of non-combatants. There is, however, something so repugnant to the vast majority of the Anglo-Saxon race in the idea of wreaking vengeance on unarmed, defenceless people, even for the most heinous crimes committed by other persons, though those persons belong to the same race and nation, that it is unlikely that reprisals for the German aeroplane and Zeppelin raids over England and France will be sanctioned. Moreover, apart from sentiment, the fact remains that the explosives can be more usefully employed in wrecking war-material factories, railway lines, bridges, naval arsenals, shipping, U-boats in port, etc., than in killing women, children, and old men. And in addition to the services the Allies' avions will render by aerial bombardments, and by participation in battles on the earth with their *mitrailleuses,* it may be possible for the seaplanes to attack, cripple, and perhaps wreck German war vessels in port, or even at sea."

ALLIES TO LAUNCH GREAT AIR WARFARE.—Great Britain is now amply ready for the air raid reprisals on Germany which have been decided upon. War planes of every type can now be produced by the Allies in far greater numbers than by the Central Powers, and it is asserted that the Allies are equipped for aggressive air warfare on a great scale.

The cabinet's determination was reflected in a speech made by Lieut. General Smuts, formerly commander of the expedition against German East Africa and now a Privy Councilor, who is in close touch with the War Council. The occasion of the speech was a luncheon to presidents of Chambers of Commerce of the United Kingdom.

General Smuts said that Germany, "defeated on the battlefield and balked in the submarine campaign, is now, in impotent rage, more and more striking at us through our non-combatants, through our women and children." Aerial warfare against the defenceless was the new weapon, he said; and he predicted it would not only fail, but would prove to be a terrible boomerang.

His announcement, which has been awaited with great anxiety by the whole nation, is believed to mark a new turning point in the war, as, far from accomplishing their purpose to terrorize the civilian population by the introduction of their latest cruelties, the Germans have only strengthened

the determination of the British people to go on with the war to certain victory.

General Smuts said that the people of London after the recent raids were thinking less of peace than ever before.

"Last month," said General Smuts, "our naval and military airplanes dropped 207 tons of bombs behind the lines of the enemy. In the same period he dropped 4½ tons of bombs on London. In that month we bombed him on 23 days and on 19 nights, chiefly attacking his airdromes and, as the figures show, damaging his machines and pitting his airdromes with shell holes. We also bombed his billets, trains, transports and railway stations, causing him the heaviest losses."

General Smuts said that whatever had been the danger of the submarine it had ceased to be a decisive factor. "Take that from me as a bed-rock fact," he exclaimed.

Reviewing the air attacks on London and other English towns and cities, General Smuts said a way had been found to put the Zeppelins out of business, and that the same fate would befall the airplanes. He said the public might rest assured that the government would leave nothing undone to meet this menace.

Referring to accounts in German newspapers of the demoralizing effects and the material damage wrought by the air raiders, General Smuts said:

"You know the material damage in these raids has been absolutely negligible, and as for the loss of life, many times more people have been killed or injured in bus accidents than in these air raids. But applying the principle of 'an eye for an eye and a tooth for a tooth,' we are most reluctantly forced to apply to the enemy the bombing policy which he has applied to us."

The total air losses in London last month, General Smuts said, were 51 persons killed and 247 injured.

"During the first nine months of this year," he continued, "the losses from air raids were 191 persons killed and 749 wounded, against 487 killed and 14,104 injured in traffic accidents in the metropolitan police area.

"Allow me to emphasize two points which I hope will be borne in mind when it is ultimately found that my words are not bluff, but serious and far-reaching in their import.

"Firstly, we did not begin this business of bombing industrial and populous districts. The enemy began the practice, just as he began the use of poison gas and other contraventions of international law. And we have been most reluctantly forced to follow suit after a long delay, which severely tried the patience of the British public.

"Secondly, I look upon these developments of the arts of war as utterly bad and immoral, and while I do not fear them if, as in the present case, they are forced on us, yet I should infinitely prefer that both sides should desert such cruel practices. We shall do our best to avoid German abominations, and in our air offensive against military and industrial centers of the enemy we shall use every endeavor to spare, as far as is humanly possible, the innocent and defenceless who in the past have enjoyed the protection of international law.

"But it is inevitable that in any extended aerial offensive into enemy territory into which we have been forced they should also suffer to some extent and I can only express my deepest regret that these developments should have been forced on us. This war has already been cruel and horrible beyond any known in the history of mankind, and its sorrows and anxieties are slowly breaking the heart of humanity.

"It is almost unbearable to think that another chapter of horrors must be added to the awful story, but we can only plead that it has not been our doing, and the blame must rest on an enemy, who apparently recognizes no laws, human or divine, who knows no pity or restraint, who sang *Te Deums* over the sinking of the *Lusitania* and to whom the maiming and slaughter of women and children appear legitimate means of warfare.

"In the face of such abominations, it is not for us to fold our hands meekly. We can only fight to the uttermost for the ideals of a more human civilization, which we trust and feel convinced will triumph in the end."

General Smuts said that the national temper, instead of weakening, was hardening under the strain of these terrors and abominations.

"If the Germans understood the psychology of this people," he said, "they would have no doubt about the results. Cowards become more cowardly under threat of danger, but brave men and women only become more determined. The people of London, after these raids, are thinking less of peace than ever before.

"But the Germans never have understood the psychology of their enemies, and so they will continue to blunder to the end of the chapter. It is wrong to think that we hitherto have had no means of carrying our aerial warfare into the enemy country. I already have said that ever since the battle of the Somme we have had a clear military superiority in the air, and on a small scale we could have followed that up by bombing enemy centers as the enemy bombed London and other places in this country. But we felt that we should prepare for an air offensive on a large scale, and we were also anxious to avoid adding further horrors to a war already the most cruel in the history of the world."

After reiterating his statement that the Germans already were beaten and that their rulers knew it, General Smuts said:

"Defeated and retiring everywhere, the enemy has singled out one opponent for an offensive blow. Germany is doing her best to strike down Russia. Great as have been the German blunders in the past, I am not sure that this is not her greatest and most fatal blunder of all. The invasion of Belgium and the submarine campaign were the colossal mistakes which cost Germany this war, and her striking down of Russia at this juncture may do more, and may even compromise her distant future.

"For, in striking down Russia, she is striking one who cannot defend herself, who, like Germany, was an autocracy but has received new consciousness from the sufferings of this terrible war; one who has reached some inward crisis of the soul, like the soul on the way to Damascus, and now is being led, blindfolded and incapable of offensive action.

"Whatever the strict rights of the case may be the spirit of history will never forgive Germany. The liberty which is being painfully born in Russia will rise to vindicate Russia in the coming generation, and will be the most implacable enemy for future Germany."

General Smuts concluded with an expression of belief that the war already had been won and that the military, moral and economic forces marshaled against Germany would prove invincible.

"But many a battle has gone wrong during the last half hour; many a victory has been forfeited or lost through indecision, wavering or loss of nerve at the end," he said. "What is required of you is the unalterable determination to see the struggle through, not in a selfish, imperialistic spirit, but in the conviction that this is the Armageddon in which the power of militarism must be slain forever, and to realize that it is not only our duty but our right and privilege to fight to the utmost to secure that victory."

The impending retaliation for the German air raids is the main feature of the London papers, made conspicuous with big headlines. No opposition is expressed, even in quarters where reprisals have been deprecated in the past, while elsewhere the decision is welcomed with enthusiasm, though qualified with questions as to why it has been so long delayed and with fears lest it be further delayed and carried out without sufficient minues.

It is asserted that the government's decision does not indicate any sudden change in policy, the matter having been long under consideration, and that acquiescence to the popular demand is in no wise implied. The apparent

delay in adopting the policy of retaliation was due, it is said, to considerations of construction and the necessity of keeping the requirements of the aviation arm on the western front supplied.—*N. Y. Times*, 5/10.

TURIN-LONDON TRIP.—Captain Laureati, of the Italian Army, accompanied by an observer, to-day made a non-stop aeroplane flight from Turin, Italy, to London. He covered the 656 miles in seven hours and twelve minutes.

Captain Laureati on last August 29 established a new world's long distance record when he flew from Turin to Naples and return. The distance was about 900 miles.—*N. Y. Herald*, 25/9.

AIRCRAFT LOSSES IN JULY.—Our air service overseas had three famous days last month. The first was July 11, when our aerial activity seems to have borne no special relation to operations in the field. At any rate, our men destroyed 14 German machines and drove down 16 out of control, while another was shot down by gunfire from the ground. Again, as the inevitable prelude to battle nowadays, we got really busy before the third battle of Ypres. On July 28 we destroyed 15 enemy machines and drove down 16 out of control, and on the following day we crashed 16 and caused another 14 to spin down earthward. On these three days alone, therefore, we definitely accounted for 46 Germans, while the fate of 48 others is uncertain. Our loss for those three days was 25 machines missing, not all of which necessarily crashed or were brought down as the result of air fighting. The following are the complete figures of the month's losses on the western front:

Destroyed by British in aerial combat, including four machines which fell in our lines and nine destroyed on returning from raids on England	131
Destroyed by British gunfire, including two in our lines	5
Destroyed by British trawler on East Coast	2
Destroyed by French in aerial combat	47
Destroyed by French gunfire	8
Destroyed by Belgians in aerial combat	6
Destroyed by British trawler on East Coast	2
Total German loss	201
Number driven down by British out of control, including one by anti-aircraft fire	127
Number driven down in enemy lines by French	54
Total	181
Total number of English machines missing	92
Total number of Allied machines claimed as destroyed by the enemy, including one French machine in Westphalia and two anti-aircraft victims	130

One word of caution. The term "driven down out of control" should not be taken too literally, for a spinning nose-dive is to-day one of the accepted battle maneuvers.—*Aviation*, 15/9.

AIR FIGHTING IN AUGUST.—The British and French communiqués, published during August, show that 179 enemy airplanes and nine enemy balloons were brought down, and 118 enemy airplanes and two enemy balloons driven down. The Germans during August claim to have shot down 131 Allied airplanes and 15 Allied balloons. Eighty-six British machines are reported by our headquarters as missing. The French give no particulars as to losses and the Germans announce the loss of only five airplanes. In August, Guynemer had his fiftieth air victory and was

elected an officer of the Legion of Honor. The Germans claim that in this month their "Chasing Echelon No. 4," under Captain Richthofen, brought down its two-hundredth adversary. Eight raids by R. N. A. S. on points in Belgium are recorded.

BRITISH REPORTS

Enemy machines brought down	106
Enemy machines brought down out of control	83
British machines missing	86
Enemy balloons brought down	2
Enemy balloons driven down badly damaged	2

FRENCH REPORTS

Enemy machines brought down	73
Enemy machines driven down in their own lines	35
Enemy balloons brought down	5

GERMAN REPORTS

British, French or Belgian machines shot down	131
German loss of machines admitted	5
Allied balloons brought down	15

—*Aviation*, 1/10.

ALLIED AND GERMAN AIRPLANE LOSSES.—Enemy claims of Allied airplane losses and admissions of their own losses during the three first years of the war are disclosed in the accompanying tables, taken from German publications. It is needless to add that the Allies' version of the comparative losses suffered in warfare would tell quite a different story for, whereas the Allies count as "destroyed" only such craft as are reported by several observers to have crashed, the enemy lists as his victory every Allied machine that is driven down "apparently out of control," such as a nose dive or a tail spin. It is well to remark that the latter maneuvers are often employed by aviators in order to escape overwhelming odds and can, therefore, by no means be taken as indicating the loss of a machine.

The detailed enemy claims for Allied and German airplane losses for the three first years of the war are as follows:

	German	Allies
First year (1914-15)	47	72
Second year (1915-16)	173	455
Third year (1916-17)	462	1,771
Total	682	2,298

—*Aviation*, 1/10.

A VISIT TO A BOMBING GROUP.—Hugues le Roux, aeronautical editor of the Paris daily *Le Matin*, gives an interesting description of his visit to a French bombing "group," the latter unit being the equivalent of the American and English "wing" and consisting of three or more squadrons.

"By day bombs are released from a great altitude. This makes for inaccuracy of aim, but at the same time renders them more effective against the population of big cities, especially when the streets are crowded.

"Destruction raids are better carried out at night. They meet with practically no interference from the enemy, and can be effected from a height of 2500 to 5000 feet.

"Sometimes, pilots have told me, we come down as low as 1500 feet over a railway station; this gives one the sensation of depositing the bomb with your hand, as it were. During the month of June our group dropped 3700 lbs. of bombs in daylight raids and 135 tons in night raids. When our

men dropped 3500 lbs. of bombs on the railway and aerodrome of Chatelet-sur-Retourue, the enemy admitted that close to $5,000,000 worth of munitions were destroyed in the fire which broke out.

"In short distance raids there is not much to choose between the French and the German, but in long distance raids the French are unquestionably superior. They carry them out almost daily. Treves (69 miles), Karlsruhe (109 miles), Ludwigshafen (124 miles), Coblentz (155 miles), Rottweil (93 miles), Essen (235 miles), Munich (217 miles), Stuttgart, Luxembourg, Dillingen, Sarrebruck, are all within reach of their bombing squadrons.

"When questioned about the future, a pilot made the following reply, which is particularly interesting in view of America's air program: 'The aerial establishment attached to army corps (that is, reconnaissance and artillery airplanes) is now adequate. Fighting machines, both in quality and quantity, must be superior to those of the enemy. There lies their limit. But there are no limits to the expansion of the bombing branch of the service. There is no material obstacle in the way of our possessing 500,000 bombers one day. Landing grounds abound in Champagne in the sectors of Noyon and Soissons, and this, our dream, we present to our new allies over the water.' "—*Aviation*, 15/9.

LESSONS OF THE WAR

KEEP SILENT.—Those who were in Paris in the early days of the war are not likely to forget the printed signs posted everywhere: "*Taisez vous, mefiez vous, les oreilles ennemies vous ecoutent*," meaning "Keep silent! Beware! Enemy ears are listening." There is good reason why throughout the shipping district to-day some such notices ought to be prominently displayed, for the reason that certain persons in a position to know something that is of material value to the enemy are not very careful about the identity of acquaintances to whom they carelessly impart information about business details of national import. At such times as the present it is nothing short of criminal on the part of any one to noise about anything he may know concerning the dispositions adopted by the government either for the dispatch of troops or supplies or for the protection of shipping in the war zone. Innocent people are too prone to make light of the German spy peril. It is not the professional spy that is to be feared as an eavesdropper or a betrayer of confidences, for such gentry are chiefly organizers of lesser spies and do not go about bar rooms trying to pick up dribs of conversation. But there is at large in this country a huge army of amateur spies who directly or indirectly are in communication with the professional information getters for the Kaiser and it is of the amateur spy especially that it behooves every one to beware. Spying is bred in the bone of the Teuton. He will go about collecting trifles in the hope that some day he may stumble upon something worth while, for which the Kaiser will reward him. To Americans such tactics are incomprehensible, but likewise are other aspects of "Kultur," such as the spreading of tetanus germs, the sinking of passenger ships unwarned, etc. The Hun is a born spy. The German Government keeps itself posted by encouraging the manifestation of this national trait among Germans residing in foreign lands and it is about time that something were done here toward putting a stop to the leaks which some day may bring about a terrible disaster.—*Shipping*, 6/10.

AIRCRAFT PRODUCTION—A LITTLE FRIENDLY WARNING.—A new industry is springing into being to convert the war appropriation of $640,000,000 into aircraft for our army and navy. Will some of the bitter manufacturing lessons taught by the experiences of the last three years be heeded in this new enterprise? In any event a few words of friendly warning are not ill advised.

The airplane is a highly developed, high-strung machine. Its engine is a superb bit of mechanism, very light for the amount of power developed, compelled to operate under adverse conditions of many kinds, with reliability as the very essence of its success. In construction it is covered with fine fits and small clearances demanding the splitting of thousandths of an inch in many of the dimensions of its parts. Its successful quantity manufacture is a problem of the highest degree of difficulty.

Parts for airplanes are to be made in many different plants, and assembled in only a few. That is, wide-spread piece production, concentrated setting up! What guarantees are to be given that the quality of workmanship and accuracy of fit will be satisfactory? Let us not forget that we did not make foreign munitions well. Let us remember the statement of an American engineer, who testifies to having seen a British plant employing 11,000 persons *making over American-made fuses.* We do not want to have a large plant by and by devoted to making over or correcting airplane parts because they were not made right in the beginning.

To avoid such an unfortunate state of affairs, and above all to make certain the production of aircraft for our army and navy, the quality of the manufactured parts must be controlled. . . . . Masterly management is needed to keep it from drifting too far away from the standard. . . . . — *Industrial Management,* October.

THE DANGER OF LETTING THINGS SLIDE.—If the war has done nothing else, it has, let us hope, convinced us of the danger of letting things slide. It is so fatally easy to allow matters to take their course if only our comfort be not interfered with! How many examples flash through the brain when a survey is taken of the happenings of the last three years? We have seen the supply of dye stuffs practically cut off, simply because in the past we allowed an industry, which had its inception in the invention of an Englishman, to drift into the hands of continental manufacturers. Spelter in prewar times came to us largely from Germany, which had even managed to gain control of the output of mines in one of our own colonies. The production of tungsten was almost entirely in German hands, and that country and Austria practically had the monopoly of certain kinds of glass. Hosts of little useful things were made by the Germans and by them alone, such as, to give a homely instance, glove and dress fasteners. Our old tin cans even were bought up for a mere song, taken to the Fatherland, and so treated that by the recovery of the tin and iron a handsome profit was realized. The Germans, too, had made great inroads into the cement machinery and glass bottle making and fluid bottling machinery trades. In fact, we might go on almost indefinitely multiplying cases in which we were content to see things remain entirely in the hands of foreigners without pausing to consider what our condition would be if supplies were suddenly cut off. Enough, however, has been said for our present purpose. It is quite evident that our easy-going attitude of *laissez faire* permitted those with whom we are now fighting to get such a hold on us that on the outbreak of hostilities we were, to use a mild expression, considerably inconvenienced. It is true that as regards cement making machinery laudable efforts had, before the war, been made in this country to wrest some of the business from Germany, but these efforts were to a certain extent counteracted by the facts, first, that the Germans would cut prices so far as to supply machinery at less than cost price in order to keep British makers off the market, and, secondly, that they had cleverly spread broadcast the untrue assertion that nothing but German machinery would make good cement—an assertion which, unfortunately, was only too readily believed by a large proportion of our cement manufacturers. Moreover, these endeavors were in the nature of an exception, and were not widely copied.

The sting of the matter is that, while we were complacently accepting all these things as nothing extraordinary, and worrying not one whit about them, the Germans were by no means acting without purpose. There

is no doubt whatever that for many years they had been plotting this world war, and had foreseen that there were other ways of fighting than simply with guns and explosives. They had, in fact, been working with a purpose while we were content to let things slide. Nor were we alone in this attitude. The United States have suffered in many respects, and, like ourselves, have had to put their house in order. Economies which previously had been absolutely neglected have had to be made. Before the war, for instance, the waste liquors from the scouring of wool were allowed to drain away, and no effort was made to recover the grease and potassium salts they contained, since the price of the latter, as obtained from Germany, was so low that it did not pay to recover them from the liquor. Germany, be it said, contains practically the only natural deposit of potash which is known to exist. Hence she was relied upon to provide it, and but few measures taken to find other sources of supply. Now, wool-scouring liquor may contain from 105 lb. to 220 lb. of fat, and from 57 lb. to 78 lb. of potassium salts per thousand gallons, and successful processes of recovering both substances are in operation. We, ourselves, at last awakened from our lethargy, have been busy, and successfully busy, in many directions. We shall, in future, no longer have to depend entirely on Germany or Austria for certain kinds of glass, for spelter, or for tungsten. Many of the very numerous odds and ends which formerly came from one or other of the Central Empires are now being made in this country. There was no reason whatever why they should not have been made here long ago. In but comparatively few cases are there secrets in the manufacture, and what secrets there were or are have been or are being rapidly fathomed? No, it was not any inherent difficulties or any undiscovered secret which deterred us. It was, rather, that there were the goods to our hands, and we bought them. It would, of course, be absurd to say that nothing should be obtained from this or that country, for in that case there would be nothing which we could obtain in exchange of commodities of which we have the monopoly, or which we can produce more cheaply than the other countries. Hence, we cannot in future look forward to taking none of Germany's products, though we fancy that prejudice against such products will last for many years to come. What we do maintain, however, and what we believe is really recognized by the nation at large, is that for things essential we should rely more on ourselves, and certainly not rely on one source almost entirely as we have hitherto done.

That which has happened during the past three years has certainly made us survey things generally in an entirely different light from that in which we were accustomed to regard them, and to ask the question "Is all well?" The answer to this inquiry cannot certainly be given, with truth, in the affirmative. All is not well everywhere. Possibly in nothing is it so far from being well as in our manner of using coal. It is true that long before the war many thinking minds had drawn attention to the heavy waste attending some of our methods of consuming this invaluable gift of nature; but for the most part the warnings have passed, if not unheeded, at any rate, disregarded by the majority. The open fire is still indulged in with, consequently, the absolute loss of everything saving a small proportion of the heat of the fuel being utilized in any way, and that only in giving transient warmth to human bodies, and in preparing food. Even with the best of boilers and steam engines we do not obtain more than, say, one-twelfth of the total energy in coal, and we lose all the many other things it contains, which, if recovered, would represent a large value in money. We have long known and recognized these things, yet have we made any serious attempt to right the wrong? Have we not just let things slide? To a great extent we certainly have. True, we have sought to get as near to the theoretical thermodynamic efficiency as possible in boilers and engines, and some remarkable results have been achieved; yet even so we have wasted and are still wasting at least four-fifths of the possible energy of the coal, apart, entirely, from the absolute casting away of the

by-products. Is it not time that this particularly important problem were much more energetically faced than it has been up to now? Nor are we alone in fault as regards the squandering of our coals. There are many directions in which waste is occurring in a fashion only a little less lamentable. The wealth in nitrates which, year by year, is literally flung from us by reason of our methods of sewage and refuse disposal is enormous. True, again, there are signs of reform in this direction, but for the most part there is apathy, the only desire being to reduce these so-called waste products into a condition in which they shall not be harmful to health. The theme might be enlarged upon, and other instances of waste might be adduced; but we have said enough. For the time being, and until the war is over, we must devote the whole of our energy to bringing the conflict to a successful termination. But let us not, simply because we must do this, allow all other considerations to escape our attention. Let us beware of repeating the mistakes of the past, and of permitting the perpetuation of malpractices. Let us frankly acknowledge that there are serious and vital problems to be tackled, and let us honestly grapple with them with all our might at the earliest opportunity. It will doubtless mean the discarding of many methods which have been practiced by generation after generation; but mere sentiment must not be allowed to stand in the way of advance.—*The Engineer, 21/9.*

"CARRY ON."—Few dying words are oftener quoted from the British section of the western front than those of "Carry on." The Frenchman has said, "For France!"; but the Britisher is less introspective; he bids no one to pause and care for him while the work is still to do. The phrase is one familiar to all in the military service "over there," and our own enlisted men catch the meaning of it too. The Boston *Herald* explains it as coming to the lips when an officer appears and every man stands at attention until he passes. "The officer wishing to release these men from this token of respect unduly often simply says, 'Carry on.'" That is, "Return to whatever engaged you when I appeared." The *Herald* finds it "precisely the word that should be spoken to everybody here at home just now"—

"As cherished young men are going to training camps and war service, the hearts of many are moved to stand at attention, as it were. This is fitting. It is natural and for the good of the men standing forth as the nation's defenders, as well as for the good of our people generally, that manifestations of honor and affection be made in homes and communities. But when that has been done—what then?

"The men who have donned the nation's various uniforms and gone to their places of hardship and danger would surely make a common answer to that question. They would say to their friends at home, 'Carry on.' They want the life at home to go on as it was when they were with us. It will cheer and nerve them with strength to know that daily duties are being performed unfalteringly, home comforts maintained in full without depression, pleasures continued much the same as before they left us. As autumn and winter bring the time when the life of home and school, church and community, usually takes on fuller activity and interest, our soldiers and sailors will wish to know that it is so now, though they are far away.

"Of course they would not have us forget them. Most certainly we must and shall do many things all these days to provide for their welfare and mightily support their huge undertaking. We at home are at war as truly as our men who have gone to the fighting. But amid all our war-time activities, we must not fail to maintain the endeared life at home which is such an empowering memory and upholding in the hearts of our fighting men. Always with down-heartedness. Have done with weakened interest and activity. Keep the home bright and cheerful, the school full of spirit, the church alive with hearty workers, social pleasures engaging and plenti-

ful; and push business man-fashion, spurning the folly of gloom. Let letters to the men gone to war bear abundant proof of all this.

"'Carry on'—not in the sense of giving way to loneliness and sorrow and anxious depression. Put the military meaning into that phrase. 'Carry on,' here at home, even as the men in war service have learned to lift those words to fuller meaning. For one of them has written—

"Carry on! Carry on!
Fight the good fight and true;
Believe in your mission, greet dawn with a cheer;
There's big work to do, and that's why you are here.
Carry on! Carry on!
Let the world be the better for you;
And at last, when you die, let this be your cry:
'Carry on, my soul! Carry on!'"

—*Literary Digest*, 13/10.

MISCELLANEOUS NOTES

EXTRAORDINARY FEAT OF DRY DOCKING.—One of the most remarkable feats ever known to have been accomplished with a floating dry dock was carried out recently by the Inter-Island Steam Navigation Company, Honolulu, with a floating dry dock of 4500 tons lifting power designed and built under the supervision of William T. Donnelly, consulting engineer, New York.

The Japanese first-class cruiser *Azuma*, which is a twin-screw vessel of 446 feet length overall and 430 feet length on the water-line, with a beam of 59 feet and a displacement on a draft of 25 feet of 9300 tons, sustained damage to her propellers and it became necessary to get the propellers and shafting out of the water for repairs and replacement. The only dry dock available was the floating dry dock at Honolulu, which had a lifting power of only 4500 tons and a length of 300 feet, as compared with 9300 tons displacement and 446 feet length of the cruiser.

As it was impossible to place the entire vessel in dry dock, the dock was submerged and placed under the stern of the vessel, and then pumped out, with the result shown in Fig. 2, where it will be noted that one end of the dock is at its maximum submergence, while the other end of the dock has lifted the rudder and propellers of the vessel entirely out of the water. Fig. 1 shows a stern view of the vessel held in the dock with the propellers out of the water.

So far as known, this is the first time that such an extraordinary feat of dry docking with a floating dry dock has ever been undertaken, and its successful accomplishment is eloquent testimony to the enterprise and ingenuity of the engineers who carried it out, as well as of the utility of this type of dock for emergency work.

The Honolulu dry dock, which was used for this work, was described in detail in our issue for July, 1914. The dock has steel wings, 300 feet long, and eight wooden pontoons, making the length over all 352 feet. The dock has a width overall of 100 feet and a clear width between the wings of 80 feet. It is designed to take a draft of 20 feet over 4-foot keel blocks. The pumping machinery is operated by electricity and comprises eighteen 10-inch centrifugal pumps, one in each end of each pontoon. A 200 horsepower motor drives the groups of nine pumps on each side of the dock.—*International Marine Engineering*, October.

HOW THE REVENUE TAX AFFECTS INCOMES.—The following is a computation of income taxes based on the final revision of the income tax section of the war revenue bill as made by the conference committee. The figures given are those for married men.

The taxes will be collected for the calendar year, 1917. Methods of collection, places of payment, etc., will be the same as provided in the

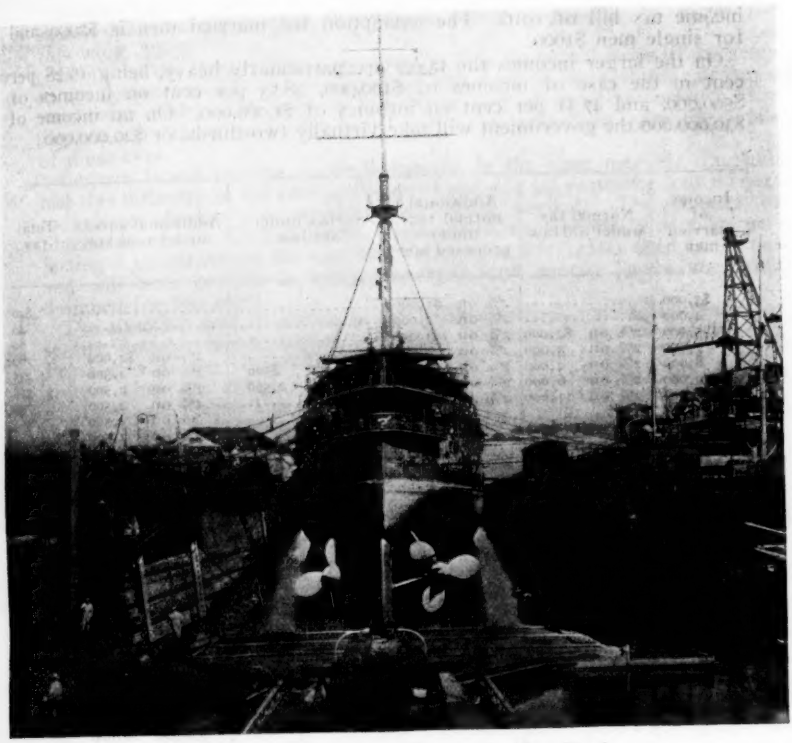


FIG. 1.—Stern View of Cruiser in Dry Dock

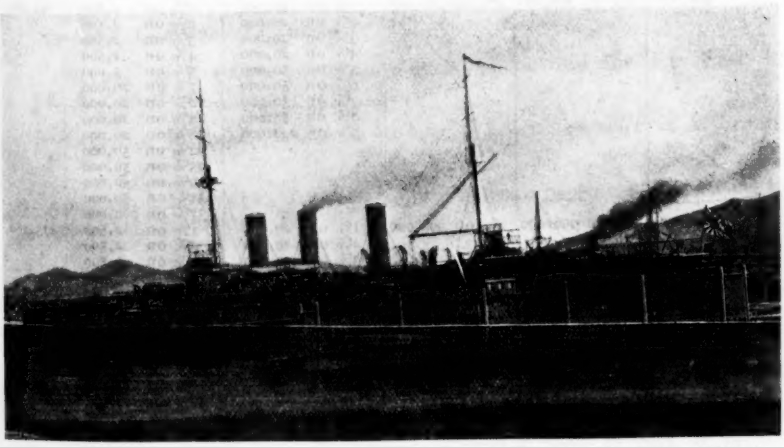


FIG. 2.—Flotation of Cruiser and Dry Dock With Vessel's Stern Lifted Out of Water for Repairs to Propellers

income tax bill of 1916. The exemption for married men is $2000 and for single men $1000.

On the larger incomes the taxes are particularly heavy, being 16.28 per cent in the case of incomes of $100,000, 38.53 per cent on incomes of $500,000, and 47.51 per cent on incomes of $1,000,000. On an income of $30,000,000 the government will take virtually two-thirds, or $20,000,000:

Income of married men	Normal tax under old law	Additional normal tax under proposed law	Surtax under old law	Additional surtax under new law	Total tax
$3,000	.....	2% on $1,000	.....	.....	$20
4,000	.....	2% on 2,000	.....	.....	40
5,000	2% on $2,000	2% on 3,000	.....	.....	80
7,000	2% on 3,000	2% on 5,000	.....	1% on $2,000	180
8,000	2% on 4,000	2% on 6,000	2% on $500	1% on 2,500	235
10,000	2% on 6,000	2% on 8,000	2% on 2,500	1% on 2,500	355
15,000	2% on 11,000	2% on 13,000	.....	1% on 2,500 2% on 2,500 3% on 2,500 4% on 2,500	730
20,000	2% on 16,000	2% on 18,000	.....	1% on 2,500 2% on 2,500 3% on 2,500 4% on 2,500 5% on 5,000	1,180
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—*The Baltimore News*, 2/10.

SIGNAL CORPS APPEALS FOR LENSES FOR AIRCRAFT CAMERAS.—The chief signal officer requests that the widest publicity possible be given the following appeal:

People of the United States are asked to help the signal corps of the army to get lenses enough for cameras for the fleet of observation airplanes now being built. The need is immediate and of great importance; the airplanes are the eyes of the army and the camera lenses are the pupils of those eyes.

German lenses can no longer be bought in the open market. England met this difficulty in the earlier stages of the war by requiring lens owners to register lenses and requisitioning those needed. The Bureau of Standards of the United States Department of Commerce is now perfecting a substitute for the German "crown barium" glass used for lenses and will later be able to meet the needs, and special lenses are being designed for this work.

The situation now, however, is that with airplanes soon to be ready for service, suitable lenses cannot be bought. Hundreds are needed at once. Possessors of the required types are urged to enlist their lenses in the army. They are asked immediately to notify the photographic division of the signal corps, United States Army, Mills Building Annex, Washington, D. C., of lenses of the following descriptions which they are willing to sell, stating price asked:

Tessar anastigmat lenses, made by Carl Zeiss, Jena, of a working aperture of F. 3.5 or F. 4.5, from 8¼ to 20 inches focal length.

Bausch & Lomb Zeiss tessars, F. 4.5, from 8¼ to 20 inches focal length.

Voigtlander Heliar anastigmat lenses, F. 4.5, 8¼ to 24 inches focal length.—*Official Bulletin*, 11/10.

CURRENT NAVAL AND PROFESSIONAL PAPERS

UNITED STATES

JOURNAL OF THE AMERICAN SOCIETY OF NAVAL ENGINEERS. **August.**—Forced Lubrication, by *Lieut. Commander A. T. Church.* Aeronautic Propellers, by *Spencer Heath.* Measuring Shaft Horsepower of Destroyers, by *Lieut. Commander F. W. Sterling.* Boiler Gaskets and Packings for the Navy, by *Lieut. Commander H. T. Winston.*

TIMES CURRENT HISTORY MAGAZINE. **October.**—Anti-Submarine Tactics, by *Lieut. Commander C. C. Gill.*

REVIEW OF REVIEWS. **October.**—Japan, China, and the Far East, by *K. K. Kawakami.*

INFANTRY JOURNAL. **October.**—Medals, by *Lieut. Colonel Fred R. Brown,* N. A.

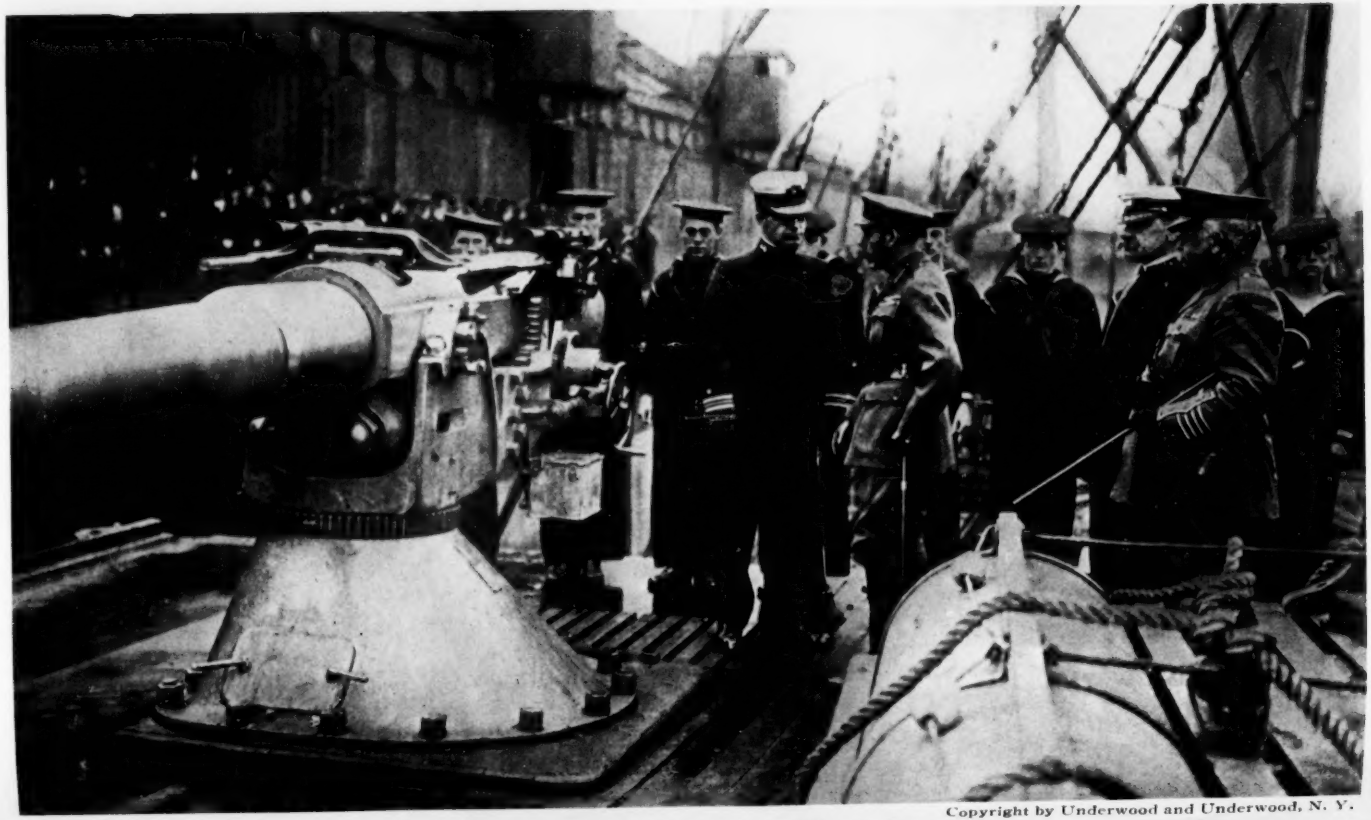
ATLANTIC MONTHLY. **October.**—The Challenge of Naval Supremacy, by *John Hays Hammond, Jr.*

GREAT BRITAIN

CONTEMPORARY REVIEW. **September.**—The Future of the German Colonies, by *Sir H. H. Johnson.* The Three European Settlements, by *Sir John Macdonnell.*

FORTNIGHTLY REVIEW. **September.**—What Would Nelson Have Done? II, by *Archibald Hurd.*

NINETEENTH CENTURY. **September.**—Common Sense in War, by *Spencer Wilkinson* (Professor Military History, Oxford).



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KING GEORGE ON BOARD A U. S. MAN-OF-WAR AT LIVERPOOL

INTERNATIONAL NOTES

1. Naval War Notes.....2699
2. Diplomatic Notes 2762

NAVAL WAR NOTES

PREPARED BY

Lieutenant Commander I. C. Kidd, U. S. Navy

Strategy 2699
Naval Operations
- Atlantic 2704
- Pacific 2716
- North Sea 2717
- Baltic 2726
- Mediterranean 2732
- Adriatic 2733
- Black Sea and Turkish Waters.....2734

U. S. Army Notes 2735
General Notes 2744
Index of War Vessel Losses 2761

STRATEGY

Germany Sought to Stop Japan's War Aid to Allies.—Germany has engaged in a new but futile attempt to swerve Japan from her course in the war. Advices have been received in Washington that while the Japanese Imperial Mission has been in this country with its message of good feeling toward America and of loyalty to the cause of the Allies, the Prussian Foreign Office has dangled the bait of political and commercial expansion in China before the Japanese Government in the hope of inducing it to be actually neutral while nominally continuing at war.

That information, which has reached high officers of the government here, makes especially significant the speech of Viscount Ishii in New York, when the head of the Japanese Mission called upon the United States to cast out the devils of suspicion and distrust that have found lodgment in some quarters in each of the two countries. He charged then that China's troubles and the differences that occasionally have arisen between Japan and America had been fomented by German intrigue.

Prussian diplomacy apparently learned nothing from the stupid attempt to embroil Mexico with the United States and to induce Japan to accept a separate peace, which was made by Dr. Zimmermann in his note sent to Count von Bernstorff dated at Berlin, January 19, 1917. Zimmermann fell, but his methods still are being pursued.

The latest unavailing assault on the honor of Japan took the form of a direct bribe and involved the integrity of China. Japan and Germany have had differences in the past, but there have been close relations also, which Germany figured might go far in the establishment of an understanding. But after the war with China Germany was one of the powers that snatched from Japan the fruits of her victory, and that engendered a feeling of bitterness. Germany, however, felt that such feeling was not

King George on Board a U. S. Man-of-War at Liverpool
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insurmountable. By dwelling on the school troubles in California and other features in the relations between the United States and Japan, which the Prussian agents harped upon as injurious to the national honor, it was hoped that a feeling of hostility toward America could be developed that would overshadow every other international consideration in the popular mind.

As Viscount Ishii said in his New York speech, the United States, as a Pacific power, is a natural contender for the trade of China, and the fact was used to present a distorted argument that America's interests necessarily were inimical to those of Japan.

The bargain proposed in the latest effort of the Prussians to draw Japan practically out of the world conflict was that Japan should under no consideration send any troops to the Russian front; that the supply of munitions should be so diminished as to make them no longer a factor in the Russian scheme of military operations, and that the Japanese merchant marine be kept in the Pacific engaged in peaceful commerce, and not be diverted to the Atlantic for the transportation of war supplies to the western front. Negotiations regarding the sending of vessels to the Atlantic have been in progress for some time between the United States and Japan, but Japan has been waiting to have demonstrated the absolute necessity for such a move, which would seriously hamper her own commercial interests now and might leave them prostrate after the war.

In consideration of Japan maintaining a "hands off" policy during the continuance of the war Germany stood prepared to pledge that, in victory or defeat, she would maintain at the peace conference the paramount interests of Japan in China and would make whatever stand was necessary to insure recognized expansion of Japan's political, and, consequently, commercial, ascendency in China. Germany professed to have no designs herself in the Far East and to bear no ill will because of the Japanese seizure of Kiao-Chau in the present war.—*N. Y. Herald,* 1/10.

SUBMARINE BASES ON SPANISH COAST.—The serious breach of diplomatic procedure involved in the transmission of German cables through Sweden is the least of the international troubles which Washington sees growing out of the relations between the belligerents and the neutral nations.

It is toward Spain that official eyes here have been turned with most serious apprehension. The belief exists, and it is a belief based upon no mere conjecture, that the Mediterranean coast of Spain is regularly used as a base for German submarines. It is understood the attention of the Spanish Government has been called to this continuing and disastrous violation of neutrality, but if any steps have been taken to remedy the situation they have been both perfunctory and futile. Just how far the representations concerning the injury done to the Allies have gone is not known here outside of the closest official circles.

The U-boat activities in the Mediterranean have resulted in greater losses of ships than anywhere else. The submarines have made themselves perfectly at home in those waters, and there seem to have been no intervals when their activities were lessened, as has been repeatedly the case in the North Atlantic. Their unremitting activities have worked incalculable harm to the Italian offensive, the most promising offensive on all the fronts. The losses of supplies for Italy's armies have handicapped the operations against Austria most heavily.

The Austrian base at Pola has not been a substantial benefit for submarine operations, as the Italian control of the Adriatic with destroyers and wonderful aircraft makes operations, even of submarines, difficult in those restricted waters.

For the German submarines to leave Zeebrugge, go to the North Sea around England, pass France and Spain, ply their work in Mediterranean waters, then take the long trip back to Zeebrugge for supplies, and still

leave enough U-boats to carry on such deadly warfare had not been considered possible.

Therefore began the search for the real temporary bases upon which the U-boats could draw for their supplies. Attention soon centered on the coast of Spain and in the harbors of the Balearic Islands. The results have been most disconcerting to the investigators for the Allies. The allegation is that the German agents, operating through small traders and owners of coastal vessels, have been seeing that no U-boat went short of any essential.

The Mediterranean is easy of access to the U-boat through the Straits of Gibraltar. The waters are deep and the tides are so swift that no system of nets, which have been found so effective in the Straits of Dover and the English Channel, could be operated. Despite any system of weighing, the swift currents would flatten the nets horizontally and their effectiveness would be lost.

Consequently the attention of allied diplomacy is centered upon this Spanish situation.—*N. Y. Herald*, 19/9.

APPARENT CHANGE IN U-BOAT POLICY.—Two important changes in Germany's U-boat campaign are clearly indicated here by latest advices. Reports received at the Navy Department through the State Department refer to a strengthening of the submarine lines in the Mediterranean, presumably in anticipation of winter weather, and direct reports from the war zone call attention to the new Teuton policy of massing U-boats against merchantmen under convoy.

The whole submarine campaign is, according to naval experts, now entering into a new stage which may in a few weeks' time demonstrate to the world whether the U-boat menace is to be an all-year-round affair or whether it is to lose its efficiency in winter. No one here can now answer that question. British and American naval authorities confidently believe that the coming of short winter days and cold, stormy weather will prove a defence to Entente and American shipping which the U-boats cannot pretend to cope with, but German experts on the other hand boast that the submarines will operate just as effectively in all seasons.

The next few weeks will serve as a barometer for the fall and winter operations of the U-boats and the first weeks of cold weather will tell the tale.

There was a tendency here yesterday in some quarters to take the last weekly report of the British Admiralty as an indication of a falling off in submarine effectiveness, due possibly to the shorter hours of daylight for operation and the approach of the stormy season. Eight vessels above 1600 tons and 20 below that figure are reported sunk in the British statement. It is the smallest number of vessels above 1600 tons since the beginning of unrestricted submarine warfare, but it is the highest number of smaller vessels sunk since the week ended June 17.

I know by experience that it is not safe to attempt to interpret what these figures mean, and I have therefore made no attempt to judge for myself, but consulted several of the best-informed officials and diplomats here, who have access to the confidential official reports. I will give their answers exactly as they were given to me.

"Figures do not necessarily mean much in a case like this," was the first reply, "and until we know the amount of tonnage sunk, which we will get confidentially later, we cannot say that the last report is encouraging. In the recent case the number of ships above 1600 tons sunk was only half as many as the week before, but we subsequently found that the actual tonnage sunk this latter week was nearly double."

"Do not minimize the gravity of the menace on the basis of the last reports," was the second answer. "The larger percentage of smaller ships may indicate that the submarines are preying on small cargo ships whose importance does not warrant the use of a naval convoy, but it may mean that our new policy of sending small ships out in groups is making

them easier targets. It is too soon to judge in advance of further information."

"There are undoubtedly signs that the Germans are preparing for a concentration in the Mediterranean in advance of cold weather although they will doubtless continue to operate in the present northern zone to a limited extent. This, coupled with the new German plan of massing U-boats against convoys, may have taken from the roving strength of the individual submarines."

The theory in naval circles here is that the plan to extend operations in the Mediterranean is based on the conviction of the German Admiralty that it will virtually be impossible to maintain the efficiency of the U-boat operations in northern waters as winter approaches. Aside from the short days and stormy weather which operate to the disadvantage of the U-boats, the two prime factors which are against them in winter are the unfavorable effects which cold weather has on their batteries and the hardships for the crews operating in icy waters.

There have been many indications of the lengths to which German militarism would go in imposing hardships on its subordinates but it is doubted whether U-boat crews will be asked to go through the ordeal of carrying on an extensive campaign under northern seas in winter weather.

Heretofore German U-boat operations in winter have been negligible. Although unrestricted submarine warfare was proclaimed on February 1, 1917, it was not until spring that the campaign was fairly gotten under way. Count von Bernstorff, former German Ambassador to the United States, made the significant statement early in February that "results cannot be expected until the weather grows warmer."

"It's not working right yet because of the cold weather," the former Ambassador said to a score of newspaper men at that time. "But wait until the Fourth of July," he added, "the war'll be over then, for not a thing will get into England."

This forecast assumes particular importance now, not because it shows how the German boasts came to naught, but because it is an official admission that cold weather automatically robs the U-boats of their greatest effectiveness.

Aside from the fact that the batteries lose much of their effectiveness and the hardships for the crews become almost unbearable, the short periods of daylight operation and the winter storms would seem to positively indicate a let up in the sinkings by the U-boats. Naval officers here, however, are not counting on this in advance and are now inclined to believe that Germany will seek to readjust her plan of U-boat campaign in such a manner as to meet these climatical difficulties.

One plan, which it is indicated the Germans may follow, will be to call in most of her submarines from their prescribed tours of prolonged duty and use the U-boats in group or mass formation for sporadic raids on shipping. This plan attracts particular attention because it implies possible attacks at points on the American coast. No secret is made of the fact that these U-boat mass formations will run amuck anywhere on the high seas and not confine their operations to any specific zone.

It has already been made clear that the submarines now operate whereever they regard their chances as best. The so-called concentration in the war zone has been due to the belief in Berlin that this location promised the best success against British and other shipping and not because the German Government felt bound by the limits of the war zone.

By reinforcing her submarines in the Mediterranean, Germany may hope to strike particularly hard at Italy. France would also feel the weight of this campaign, but the strain on commerce to British ports would, of course, be relieved.—*Washington Post*, 21/9.

A NAVAL OFFENSIVE.—There is an insistent demand on the part of the younger men among the allied navies, our own included, for a stronger

offensive against the navies of the Central Powers. Some of these critics go so far as to state that the allied fleets have lost the initiative and have permitted themselves to be immobilized by submarine activity.

In a superficial glance at the situation, the charge might seem to carry a color of truth; for the German and Austrian surface fleets are undoubtedly enjoying complete immunity behind the mine fields and coast-defence guns of Kiel, Heligoland, Wilhelmshaven and the Austrian base at Pola.

It is one of the elementary truths of strategy, say these critics, that the duty of a superior fleet is to find and destroy the enemy; and this, they aver, the allied command is taking no active steps to accomplish. The Allies are possessed of a vast preponderance of naval strength and a decided preponderance of military strength, and it is urged that they should make use of this by initiating a bold offensive, using their combined land and sea forces to reduce the enemy's naval bases.

It seems to us that the answer to this is obvious. In the first place, if sufficiently powerful forces were detached from, let us say, the western front, for an attack on naval bases, it is probable that the Allies would lose that initiative which has been theirs for over a year; and it might well happen that the Germans, conscious of the enormous natural and military strength of their coast defences, would concentrate their land forces in one tremendous effort to break through the weakened western front.

Apart from the military risk involved in such a venture, it is certain that a naval attack by capital ships against the naval bases would not only fail to make any serious impression but, because of the shoals, sandbars and narrow channels of the German coast and the enormous strength of the heavy guns and mortar batteries of the German fortifications, any such attack would mean the loss and disablement of the flower of the allied dreadnought fleets. For let it be understood at once that it would be futile to send against the German coast defences old pre-dreadnought battleships, such as failed against the comparatively antiquated forts at the Dardanelles; they would be hopelessly outclassed in range and in weight of metal.

We have it on the very best of German naval authority, and we have known it for some years, that the most important of the German coast defences include powerful batteries of 16-inch high-powered rifles and 16-inch mortar batteries. To send a fleet even of super-dreadnoughts into the fire zone of these batteries, where the ships would be restricted to narrow channels and incapable of that maneuvering which is one of the best defences against gun-fire, would be simply to court disaster. However, although we believe that an offensive against the sheltered German and Austrian fleets would be suicidal, we are strongly of the opinion that a more vigorous offensive should be undertaken against the German U-boats. That is to say, instead of allowing the U-boats to carry the offensive to the Allies in the Channel, the Atlantic and the Mediterranean, the Allies should carry the offensive to the submarine in the North Sea and the Adriatic.

But how? Obviously, by attacking them at the source, at the exit from their bases, or as near to their bases as the exigencies of the situation will allow.

The weapons suitable for such offence, as developed during the war, are many and various, including the net, the mine, the aeroplane, the depth bomb and the gun mounted upon a craft sufficiently seaworthy to remain on station at least from 10 days to a fortnight.

When we mention the net we have in mind, of course, the live net, or what we have already designated in these columns as the bomb-curtain, in which the net serves to carry a closely-spaced mine field held in a vertical plane. The alternative method to the live net is to use successive rows of anchored mines, the rows being separated in the vertical plane by intervals of say 20 feet, so that if the whole mine field were projected on one vertical plane, the area would be as effectively covered as if the bombs are

carried in a single net. Offensive operations of this kind can be carried out locally, at the several U-boat exits, or in one location, as in the case of the great projected net stretched from Scotland to Norway.

The most serious difficulty in the maintenance of nets which has developed during the operations of the war is their tendency to become heavily loaded with drifting seaweed. When they are so loaded the total area of the net exposed to the pull of the tides is enormously increased, and not only does the loading down tend to pull the nets under, but the accumulated stress ultimately reaches a point at which the net or its moorings parts and it is swept away.

Of course, the answer to this is that the nets were not made of sufficiently heavy gear. We are still confident that it would be possible to build a net of such heavy "scantling" and make the mooring gear of such weight and strength that the nets could be held.

It is our belief that the British have been unduly discouraged as the result of their net failures. The problem should be taken up "*de novo*" and it should be attacked progressively. Let a serious trial on a more massive scale of construction be made, let us say at Zeebrugge, where the water is shoaler and the depths are not prohibitive. If the Zeebrugge net stood the test it would be in order to tackle the mouth of the Elbe and the entrance to Wilhelmshaven. If the continuous net is found to be impracticable, the mine or bomb-curtain effect should be attempted by the use of successive lines of mines laid at varying depths as suggested above.

Can anyone dispute that it would be sound strategy to exhaust every possible means of offensive operations of this kind at the entrance to the German bases, rather than permit the U-boats to come and go at will, and choose their time and place of attack on the transatlantic and Mediterranean routes?—*Scientific American*, 13/10.

ATLANTIC

AMERICAN DESTROYER ACTIVITY.—The veil of military secrecy which has kept hidden the operations of the American naval forces in European waters was partly lifted by the Navy Department to-day, when the first of a series of reports of engagements between the patrolling destroyers and German submarines was made public.

Reports of two encounters indicating the destruction of U-boats were issued by Secretary Daniels. One is the official narrative of the fight between an unnamed destroyer and a submarine. The other is an account of what appears to have been a massed attack by submarines upon fleet under convoy given by the commander of the armed guard on the merchant steamer *Westwego*.

In both cases the circumstances indicated the destruction of one of the attacking U-boats. Patches of oil upon the surface after the explosion of a depth charge afforded evidence that the attacking vessels had met with disaster. The naval authorities do not assert that the evidence is conclusive, but it is as convincing as any that could be obtained. In many instances, if not all, only the failure of the submarine to return to port will prove definitely that they have been destroyed.

The attack upon the convoyed merchant fleet described by the commander of the armed guard of the *Westwego* was made apparently by at least six German submarines. One merchant vessel was sunk and another badly damaged. Two depth bombs were exploded by a destroyer in the wake of one of the enemy vessels and flying débris and oil on the surface of the water indicated that one reached its mark.

The statement based upon the report of the commander of the armed guard of the *Westwego* follows:

"One merchant ship was sunk and another badly damaged in an attack by enemy submarines on a large convoy of merchantmen. These were not

American vessels. The exact number of submarines engaged could not be determined, but the general belief was that there were six.

"The first intimation of the attack which the *Westwego* received was the torpedoing of a merchantman some distance away. The propeller and rudder of this ship were blown away and there was a large hole in the stern. She was afterward towed into port.

"At almost the same time a tanker was struck squarely amidships by a torpedo. This ship sank rapidly. Up to this time no one on the *Westwego* had seen a periscope. A destroyer which had been off the *Westwego's* starboard beam turned back and dropped two depth bombs. Flying débris and oil on the surface of the water followed one of these explosions.

"This marked the end of the attack. Various reports from different ships as to the number of submarines sighted were received immediately after the attack. They did not agree, but, as stated, the general belief after comparing the different reports was that there were six U-boats in the attack.

"Less than a half hour later a periscope appeared within a few yards of the side of the *Westwego* and drifted astern, where it quickly disappeared in the wake of the ship. Destroyers concentrated at the spot, and the periscope presently reappeared more than a half mile away. It was visible for a few moments only. The destroyers continued the search, but nothing more of this U-boat was seen. If she attempted to torpedo any of the ships in the convoy, there was no sign.

"The remainder of the voyage was uneventful."

The method by which the destroyers hunt down their elusive prey in the submarine zone is described in the report of the fight between the American destroyer and a German submarine. Here is the Navy Department's complete official statement:

"The Secretary of the Navy authorizes the publication of this account of an engagement between an American destroyer and an enemy submarine. This is one of a number of encounters of a more or less similar nature, the details of which will be made public in this manner as soon as possible.

" (A feature of interest attaches to this engagement because it was the occasion for a letter of appreciation from the British Admiralty which expressed admiration for the efficient and seamanlike conduct of the officers and crew of the American destroyer). For military reasons the name of the destroyer and the date and location of the action are withheld.

"The following account of the engagement was prepared from the complete reports received by the Navy Department:

"The American destroyer first sighted the submarine in the early morning of a clear day. The sea was entirely calm with hardly a ripple of foam. The submarine was running submerged, with only her periscope showing. A large number of merchant ships were in sight.

"The U-boat was less than a mile off the port beam of the destroyer and following a parallel course in an opposite direction, when the periscope was discovered. It was throwing up a column of water several feet in height, so like a nearly spent torpedo, that the officer of the deck thought for a moment that this was what it was.

"The next instant the destroyer changed its course sharply to the left and headed for the U-boat at full speed. At the same time the forward gun opened fire on the periscope. The commanding officer ordered a course steered that would bring the destroyer across the wake of the U-boat a little to the rear of the periscope.

"As the destroyer dashed across the line of bubbles a depth charge was dropped, and a column of clear water shot 30 feet into the air. The destroyer turned to the right, swiftly circling, and her starboard guns opened on the periscope as she came around to cross the U-boat's wake again. Again a column of clear water showed that the depth charge had not reached its mark.

"Another quick turn to the right brought the starboard guns to bear, but this time the destroyer turned so sharply that she was able to come down for the third attack in the wake of the submarine. The third depth charge brought up a column of clear water, and the destroyer wheeled once more, this time to the left, and all the port guns opened up, but without visible results.

"The last time the destroyer came down to the attack exactly in the wake of the U-boat and ceased firing. As she neared the end of the line of bubbles the fourth depth charge was let go and there followed a wide-spread boiling of the surface of the sea, large bubbles and at last a heavy film of oil.

"The destroyer spent some time looking for further traces of the U-boat, but none were found. She then proceeded on her course. The engagement lasted 22 minutes."

Naval authorities admit that the only definite measure of the effectiveness of the anti-submarine campaign is the extent of their offensive operations. Definite proof, except in rare cases, cannot be obtained of the sinking of submarines which are known to resort to the practice of submerging and sending up oil and débris to give the impression that they have been destroyed.

It was admitted at the Navy Department that there is no positive information regarding the number of submarines operating and the rapidity with which they are constructed. There have been reports from various sources that the Germans are building submarines faster than they are being destroyed, and that the vessels of the later type are of huge size and wide operating radius. The naval authorities assume that the submarine is being developed by the Germans. There is evidence that larger and more powerful vessels of the type are being produced, but many of the official reports are said to be based upon conjecture.

There is no reason to believe that the Germans are constructing submarines in parts and sending them to the Austrian ports of Fiume and Pola, where they are being assembled. Whether these vessels are manned by Austrians is not definitely known.—*N. Y. Herald*, 7/10.

BRITISH CRUISER "DRAKE" SUNK.—The British cruiser *Drake* has been torpedoed and sunk according to an Admiralty announcement October 4.

The *Drake* was torpedoed on Tuesday morning, October 2, off the north coast of Ireland. She reached a harbor, but then sank in shallow water.

One officer and eighteen men were killed by the explosion. The remainder of the ship's company were saved.—*N. Y. Herald*, 5/10.

U. S. DESTROYER AND BRITISH MAN-OF-WAR COLLIDE.—An American destroyer in European waters recently was in collision with a British naval vessel, which after taking off the American crew, towed the disabled destroyer safely to port. In announcing the collision the Navy Department said no one was injured aboard the American destroyer, and that the vessel since had been repaired and restored to active duty.

An official inquiry developed that the collision was unavoidable, the vessels having come together during a heavy rainstorm. No blame was placed on either the American or the British vessel.

The following official statement was issued:

"An American destroyer, operating in European waters, was severely damaged in a night collision with a British naval vessel. After the accident the British ship stood by, took off a part of the destroyer's crew and towed her into port. No one aboard either ship was injured, and the destroyer has since been repaired and returned to active service.

"An investigating board of naval officers found that the accident was due to the fact that the destroyer suddenly emerged from a heavy rainstorm which made her invisible almost up to the moment of the collision. It was, therefore, decided that no blame attached to either vessel."—*Washington Star*, 3/10.

U. S. AUXILIARY LOST.—Secretary Daniels issued the following bulletin, October 6, based on a brief cable code flashed from Vice Admiral Sims:

"The Navy Department is in receipt of a dispatch from Vice Admiral Sims which states that an American patrol vessel foundered while on duty in foreign waters on the morning of October 4. All of the officers and entire crew were saved and safely landed. An investigation is being made as to the loss of this vessel. The Navy Department has no further information concerning the details except those as above given."

The lost ship was an auxiliary, not one of the regular navy list, and was on mine-sweeping work when lost. The report that she foundered is taken here to mean she was lost in rough weather.—*N. Y. Times*, 7/10.

U. S. BATTLESHIP AGROUND.—Announcement was made at the Navy Department September 28 that a battleship of the United States Navy was aground in home waters. In accordance with the voluntary censorship rule neither the name of the vessel nor the place where the accident occurred was given out for publication.

The Navy Department has received reports that the vessel is resting easily, and it is expected that she will be floated without difficulty.—*N. Y. Herald*, 29/9.

U. S. TRANSPORT TEMPORARILY DISABLED.—Efforts to wreck the machinery of a United States transport were discovered September 30 when the engines were started. Two mechanics were arrested. One was liberated after being questioned, but the other was held for the federal authorities.

The vessel, which was one of the big Atlantic steamships seized from the Hamburg-American line, had been undergoing extensive alterations to be used as a transport for American troops.—*N. Y. Herald*, 1/10.

GERMAN SUBMARINE ESCAPES FROM CADIZ.—A German submarine interned at Cadiz made its escape last week and the government instituted an inquiry to determine the responsibility. A technical committee discovered that the officer in charge of the military services of the arsenal aided the submarine to escape. He has been dismissed and a new official appointed in his place.—*N. Y. Herald*, 8/10.

The Spanish Government has taken drastic action to discipline the officials responsible for the safe internment of the German submarine which escaped from Cadiz.

On the basis of official dispatches from Madrid the Spanish ambassador here, Juan Riano, made this announcement to-day:

"In spite of all the precautions taken by the Spanish naval authorities, including the removal of pieces which were supposed indispensable for navigation, the German submarine *UC-293*, interned at Cadiz, escaped yesterday afternoon, leaving its guns, torpedoes and munitions on land, where they had been deposited.

"The Spanish Government has opened a court martial and has also decreed the dismissal of the commander-in-chief and the first adjutant of the arsenal and of the technical commission which examined the submarine, and the release of the general in command of the Naval Department of Cadiz, apart from other disposition which it may consider fit to adopt later on."—*N. Y. Herald*, 9/10.

U. S. CUTTERS AND TRAWLERS IN WAR ZONE.—News has been received by the Navy Department of the safe arrival in European waters of a number of cutters of the coast guard, accompanied by a number of vessels formerly used in the coastal fishing trade.

The coast guard boats were detached from patrol duty in home waters when the work of recommissioning naval vessels which were in reserve had proceeded to a point where the cutters were no longer needed.

These vessels have been assigned to work in cooperation with the destroyer flotilla under Vice Admiral Sims. The censorship rules prohibit

any statement of the number of boats sent, but it can be stated that their duties will be largely confined to mine sweeping.

The fishing craft, almost entirely of the steam trawler type, will also be used in this work. Because of their unique construction, they are held to be splendidly adapted for this purpose.—*N. Y. Times*, 7/10.

SAILING VESSEL DRIVES OFF SUBMARINE.—The Minister of Marine has commended, in navy orders, the French sailing vessel *Kleber*, of 277 tons, which, on September 7, stood up to a big German submarine off the coast south of Brittany and plied a single gun so well that her opponent retreated discomfited after three hours of stirring battle.

Pierre Monnier, the boatswain, who fought the vessel after the captain of the *Kleber* was killed, has been decorated with the medal of the Legion of Honor, while the 12 men of the crew, several of whom were wounded, have been given war crosses. Seven members of the crew who particularly distinguished themselves also received the military medal in addition to the war crosses.—*N. Y. Herald*, 4/10.

SIX U-BOATS ATTACK CONVOY.—More details of the attack by German submarines recently on a large convoy of merchant vessels have been received by Secretary Daniels from the naval commander of the armed guard of the American merchant ship *Westwego*, which several weeks ago flashed the original report on the episode.

The commander's report was not given out textually, but served as the basis for a bulletin which Mr. Daniels issued, indicating that six submarines were in the flotilla that made the attack, and one merchant vessel was sunk, another badly damaged, but none of the convoyed vessels were American.

Secretary Daniels authorized the following statement based on the detailed report of the naval commander:

"One merchant ship was sunk and another badly damaged in an attack of enemy submarines on a large convoy of merchantmen. These were not American vessels. The exact number of submarines engaged could not be determined, but the general belief was that there were six.

"The first intimation of the attack which the *Westwego* received was the torpedoing of a merchantman some distance away. The propeller and rudder of this ship were blown away and there was a large hole in the stern. She was afterward towed into port.

"At almost the same time a tanker was struck squarely amidships by a torpedo. This ship sank rapidly. Up to this time no one on the *Westwego* had seen a periscope. A destroyer which had been on the *Westwego's* starboard beam turned back and dropped two depth bombs. Flying débris and oil on the surface of the water followed one of these explosions.

"This marked the end of the attack. Various reports from different ships as to the number of submarines sighted were received immediately after the attack. They did not agree, but, as stated, the general belief after comparing the different reports was that there were six U-boats in the attack.

"Less than a half hour later a periscope appeared within a few yards of the side of the *Westwego* and drifted astern, where it quickly disappeared in the wake of the ship. Destroyers concentrated at the spot and the periscope presently reappeared more than a half mile away. It was visible for a few moments only. The destroyers continued the search, but nothing more of this U-boat was seen. If she attempted to torpedo any of the ships in the convoy there was no sign.

"The remainder of the voyage was uneventful."—*N. Y. Times*, 7/10.

TWO U-BOATS DESTROYED.—Another series of thrilling reports of recent naval actions against German submarines, illustrative of the manner in

which the U-boat menace is being met, has been given out by the Admiralty. The records are official and authenticated, but no dates are given.

The statement begins by reciting how a torpedo gunboat sighted a periscope 600 yards away and turned ship so that the periscope was traveling in the opposite direction to that in which it was first seen. When at a distance of 50 yards the periscope disappeared, and the gunboat, altering its course, passed over the submarine. The impact of the collision was felt, and when the captain estimated that the submarine was under the after part of his ship explosive charges were dropped astern. A seaplane reported patches of oil on the surface, and a mine-sweeper found an obstruction on the bottom at this point.

A torpedo-boat patrolling in the Atlantic found a steamer torpedoed and sinking. The survivors were rescued, and then the torpedo-boat circled about the locality for more than an hour. Finally, a white patch of water was seen dead ahead. The torpedo-boat dashed over the spot, grazed the submarine, and dropped three submarine bombs. Oil and air bubbles reeking of gasoline came to the surface, and the mine-sweeper found another obstruction here.

The next encounter described in the statement was that of submarine against submarine. A British submarine sighted a German U-boat while both were on the surface. The British submarine dived and later picked up the enemy through the periscope. A torpedo, fired at 800 yards, caused a violent explosion in the German vessel. When the Britisher arose he found a patch of oil in which Germans were swimming. They said that they had been blown out through the conning-tower and that their craft had been hit amidships, overturned and sunk.

A story characteristic of the mine-sweeper's spirit is next recited. A flotilla of sweepers was engaged in western Channel waters when an explosion occurred between a pair of them, the wire net parting. When the sweeping wire was pulled in two mines were found entangled, one on the ship's side and the other just under the surface.

The slightest roll of the ship striking the mine's "whiskers" would have been sufficient to set off an annihilating charge. The officer in command, being responsible for the lives of the crew, ordered them to abandon the ship. Later, a senior officer with volunteers reboarded the mine-sweeper and cut the wire. The mines fell into the sea without exploding. The mines then were towed away gingerly by another ship.

The statement points out the value of the trawler, which hardly costs as much as one broadside from a cruiser. Life-saving is not involved in this service, but the courageous spirit of the sweepers is evident.

The training of mercantile marine officers in gunnery tactics is bearing fruit. A British merchantman was attacked by submarine gunfire from a distance of three miles. The shots were wild and she immediately replied. At the sixth and seventh rounds, smoke and flame burst from the forepart of the submarine which abandoned the chase.

Another ship sighted a periscope 20 yards off the beam. While swinging on a "hard-ported helm" a torpedo passed the ship. A minute later a periscope appeared on the surface on the other side. A shot was fired, quickly followed by another, and the submarine disappeared. The surface soon was covered with yellow oil.

The determination of the merchant marine is evidenced by the instance of an armed ship proceeding to Liverpool convoying one which was unarmed. A submarine was sighted at the same moment a torpedo struck the defensively armed vessel. The master ordered the ship abandoned, but he and the two gunners remained aboard. The unarmed ship fled, pursued by the submarine, whereupon the master opened fire from the sinking ship and forced the abandonment of the chase. The submarine returned and torpedoed the ship twice more. It then took the master and the gunners prisoners. Such instances as these have been investigated by a committee of the Board of Trade, shipping interests, and an Admiralty officer. Meritorious conduct has been brought to the attention of the King for award of honors.—*N. Y. Times*, 1/10.

EXCERPTS FROM A U. S. DESTROYER DIARY.—Leaves from the diary of the commander of a destroyer and sidelights on the thrills that come to the men aboard the vessels of the United States Navy in the war zone were made public October 6 in a statement issued by the Navy Publicity Bureau.

"It is stimulating from the maze of convoy and submarine search work to untangle vivid threads of adventure," the statement said. "For the first half of a certain month a few points stand out for emphasis or visualization."

They are these:

"Enemy operations have been largely in the southern part of our area. Calm weather and the moon have favored them. Merchant ships have assembled thickly at the rendezvous, and the sight has been frequent of one destroyer—often of the older type—with four or five great vessels on her hands before others assigned have joined the escort.

"Many rescues of crews have been successfully made, but they have shown a tendency to leave their ships long before danger of foundering.

"In 'behind the net,' however, it is less easy to borrow the lookout's eyes, set for the pin thrust of the distant periscope through the blue frets of the quiet, treacherous ocean. Or to hear in the dark, small hours the throbbing general-quarters alarm, the blowers hum in a racing crescendo, and the gun crews—like Tweedledums and Tweedledees in their slate-hued life preservers—tear the covers from the ammunition boxes. It is a tension to bear down at 25 knots upon the lean tramp that makes no response to the flap-flap of your searchlight blinker, spelling out the challenge; to distinguish whether the phosphorescent streak that at night flashes across your bow is made by a Hun torpedo, or the animal skippers have named the 'torpedo fish,' a blackfish or porpoise. Survivors come mutely up the side, often Lascars and Cingalese, muttering of Allah and America indistinguishably. Given cigarette 'makes,' they 'roll a pill,' calmly stick it behind an ear, and as the surgeon uncorks his iodoform in the washroom for gashes made by wreckage, some old gunner of the reserve takes pneumonia from his hours of exposure, and is put ashore at X, say, on a stretcher, and with his hours of life numbered.

The Y and the Z have been in the thick of such incidents. At 18 minutes past 1 o'clock, on the morning of the 11th, the X was steaming singly at 15 knots, with a quiet sea and good visibility for that hour. The captain was smoking a cigar on the bridge, wondering, he told me, whether Mrs. G. would ever have the pleasure of putting roses on her old man's tomb up the Hudson. A heavy explosion, without flash, shook the darkness about three miles over the port bow. A whistle bleated three times, and the radio shack called up the tube that the steamship *Kioto* was torpedoed 20 miles southwest by west of Fastnet light.

"The X switched on her general alarm for battle, changed her course to 228 degrees true and plunged thither at full speed. In two minutes she made out the staccato sparks of a blinker, repeating over and over, 'Torpedoes!—Torpedoed!' In five, she changed her course 19 degrees farther east, and at half-past one the flush decks of a single stacker of about 4000 tons loomed over the cocoa matting and thrusting men about a gun.

"She now was nearing the freighter, bow on, a bit to port. Suddenly out of the darkness to the right a livid beam rushed straight and shimmering at her under the sea. We put over full right rudder. The torpedo passed close aboard across his bows, to the left, just ahead of the *Kioto*, and as the luminous wake receded like a muffled searchlight it seemed to break spent upon the near horizon. 'Anyhow,' said the captain afterward, 'twas worth crossing the ocean to see and feel that instant. It made those roses seem a lot nearer.'

"The destroyer began to circle the *Kioto* at high speeds, with alternate right and left rudder. Her blinker stammered on that she had been hit in the port quarter abaft the engine-room. Then the lights ceased. Ten

minutes after, two loaded lifeboats emerged out of the starboard darkness. They held 59 men, including the second officer and a tall engineer, wounded in the leg. Soon after two o'clock all were safe aboard the X. She continued to circle the steamer, which was slowly sinking by the stern. Alarm of the disaster had been flashed to adjacent patrols. The Y nosed into sight and stood by, likewise H. M. S. ——, who signaled that she had taken aboard 16 more survivors and the *Kioto's* impetuous captain—he that returned to the wreck. At 20 minutes past three the freighter sank, leaving only floating wreckage and a Coston light, which flickered up from time to time until daybreak like a lantern in a lifeboat.

"Neither submarine nor destroyer had used gunfire. The German was not even sighted. Only two torpedoes were known to have been fired—the one which crossed the X's bow, and the one which settled the *Kioto*.

"Only two days before the X had had a better brush with a 'sub,' and may have gotten her; skippers put in the claim on evidence as good. She was steaming in the same area, under like conditions, when at 10 minutes past eight in the evening she sighted a pronounced wake. One could even estimate the speed at which the submarine had just submerged—about eight knots—when general quarters were called. Her course was at right angles to the destroyer's.

"The X worked up to full speed, turned with left rudder, and ran down on the right hand side of the slick. In six minutes she had reached its 'head,' ready to drop a depth charge; four minutes to run to the end of the wake, two more to allow for the sub's run beyond—and she tripped the pump. With the charge, which was set for 80 feet, was dropped a calcium torch pot to mark the place. The explosion audibly jarred the blowers, and within three minutes oil bubbles swirled to the surface. But in the 20 minutes that the X circled the vicinity, hoping the injured enemy would rise to the surface, no further sign of damage was revealed.

"Four days later the —— turned her convoy over to the —— at two hours before daylight, and returned to her regular patrol. About five o'clock in the morning she took under her wing the steamship *Pentwy*, bound for Manchester. At a quarter to eight Captain Lyons sent a quartermaster aloft to the main truck to clear a fouled commission pennant. Scarcely had the quartermaster reached it when he called down to the watch on the after deck house, 'Periscope, two points abaft the port beam!' The thing was 1500 to 3000 yards from the ——, which was 400 yards ahead of the ——, one point on her port bow. The whole body of the submarine was distinct to the quartermaster, though, oddly, invisible both to the bridge and the fore top lookout. The periscope seemed headed westward, and she at once started to submerge. Within 20 seconds, as the destroyer came to general quarters, first one torpedo, instantly followed by a second, radiated from the point where she had vanished. Both were making surface runs, for the sub's conning-tower hatch still must have been near the surface. They threw spray up fully 20 feet, clearly visible against the choppy sea. All hands on the bridge and decks saw them—as did the ——, astern; for she swung sharply to starboard, presenting her tail to them. At the same moment the —— sounded six blasts on her whistle, followed by two, to mean that the attack was being made to port.

"Both torpedoes missed the ——, but by the smallest margin. The ——, making high speed, swung with full left rudder toward the submarine.

At five minutes past nine o'clock a third torpedo was fired at the convoy, apparently from another submarine, about 200 yards ahead of the first. It approached from the broad on the ——'s beam, also making a surface run at about the same range as the first two, and it missed.

"By now the —— was in sight, some four miles distant, ready to relieve the —— of her convoy. She, too, made full headway on signal, 'Make all speed to us; submarine in sight'; and searched in the vicinity of the ——, while the —— followed the sub's slicks. The first wake tended east, but in 10 minutes lost itself among the whitecaps. The second and plainer

one led westward, irregularly, as if the sub had been zigzagging. A depth charge was dropped at its end, but a half hour's search found proof of nothing. The —— really had saved herself by quick and efficient handling.

"The ——'s adventure with the steamship *Tarquah* cannot be told until that flivver comes into port. The ——, —— and —— had a hand in it; and the first's account of the sinking of the *Obuasi*—where she arrived long after the deed—shows the defective functioning and poor marksmanship of German torpedoes. The —— reports to the same effect. At half-past 10 o'clock on the morning of the 13th she picked up in her area two boats and 23 survivors of the Greek steamship *Charilaos Tricoupis*. Two hours before, two torpedoes had been fired at her, at an interval of 25 minutes. The first struck the starboard quarter, between rudder and propeller, and, failing to detonate, did little damage; but the crew abandoned ship. The second hit the starboard side amidships, blowing up the Greek so that she sank in five minutes. Between the two shots the submarine came to the surface, but instantly submerged; not a man appeared on deck. This submarine, like all others reported for the fortnight, are declared to have been of the *U-50* to *-60* types.

"So, as yet, no blood has been spilled on any of our gun mattings. The mean, blindfold campaign continues with small apparent losses either in subs or shipping. We follow oil slicks with the thrill of a woodsman striking a strange cross-trail in the forest; we man guns over a 'periscope' that turns into a swab-handle or table leg; *vide* the ——'s and ——'s famous battle with a ventilator off the French coast. And the ——and ——, I hear, have celebrated the chagrins and thrills of it all in ballads which I shall try to send you."—*N. Y. Herald*, 7/10.

COMPLETE STORY OF THE "BELGIAN PRINCE."—With the approval of the Navy Department, the Committee on Public Information made public an account of the sinking last July by a German submarine of the British steamer *Belgian Prince*, with the loss of 38 lives, as officially reported to the department by an American naval officer in the form of a verbatim statement from William Snell, a negro cook on the *Belgian Prince*. The story was made public exactly as taken down by an officer of the American Navy from Snell, who was one of the three survivors of the crew of the steamer. It is practically in Snell's own words. The statement follows:

"About 8 o'clock p. m., July 31, I heard an explosion—did not know whether it was a torpedo or a bomb—and I ran to my lifeboat, the boats having been lowered partly from their davits. After the crew boarded lifeboats they were lowered into the water, and we rowed from the ship about 50 yards, when the submarine came to the surface about 100 yards from us and fired at the wireless on board the *Belgian Prince* and tore it down; then she came slowly between our three boats—the fourth lifeboat having been blown to pieces when the explosion occurred—leaving the captain's boat on the port side of the submarine and the other two boats on the starboard side, and asked for the captain. The captain said, 'Here I am.' He was taken into the conning-tower of the submarine and asked for his papers, and they were delivered up to the commander of the submarine.

"The commander of the submarine said, 'Is there any gunners over there?' and our officer replied, 'No, sir, they got killed.' The commander of the submarine said, 'If there is no gunners aboard there, bring your boats alongside.' And as we got alongside he said, 'All hands on deck.' When we got on deck he said, 'Hands up.' Then he lined us up in single rank from the bow of the vessel as far aft as the gun which was on board her, forward the conning-tower and which appeared to be a 6-inch gun.

"There were two men of the submarine's crew on top of the conning-tower with guns of a large bore in their hands, which they kept trained on us. Seven others of the German crew stood abreast our line on the starboard of the ship, armed with automatic revolvers, guarding us. The

captain of the submarine was also on deck and stood near the forward gun, giving instructions in German to his crew what to do. One seaman of the submarine's crew stood a little aft the conning-tower, about abreast the breech of the after gun.

"The commander then walked along the line of the *Belgian Prince's* crew, asking them if they had any arms on their persons and searching each individual. He commanded us to take off our lifebelts and throw them on deck, which we did. As the lifebelts were dropped, the commander picked them up and threw them overboard.

"When I threw my belt down I shoved it ahead on the deck with my foot, and finally stood on it. As he walked along the line, he huddled us together in a crowd, and then went and pulled the plugs out of our lifeboats, which were lying on the starboard bow of the submarine, and he then walked aft to the conning-tower, at which time I picked up my belt quickly and thrust it under a big loose oilskin which I was wearing at the time, hugging it close to my breast with my arms.

"When the commander went to the conning-tower four Germans came on deck and got in our captain's boat, which was lying on the port side of the submarine, and the submarine backed a little, then steamed ahead and rammed and smashed one of our boats, which had been lying on the starboard bow and had been cast off from the submarine a few moments before she backed.

"The four men who had gotten into our captain's boat rowed alongside the *Belgian Prince*. The submarine then steamed ahead as near as I can guess about 9 knots an hour, leaving her four men in our captain's boat alongside the *Belgian Prince*, all of us, except our captain, being huddled up together on her forward deck.

"She steamed thus about one hour and a half, at which time I noticed that the water was rising slowly on the forward deck, and it came up on my feet. I also noticed, some little time before this, which time I cannot accurately state, the conning-tower had been closed.

"The water continued to rise around my ankles and when the water got six inches up my legs I pulled my lifebelt out quickly, threw it over my shoulders and jumped overboard. The other men did not seem to know what was going to happen, some of them saying, 'I wonder if they are going to drown us,' etc. About 10 seconds after I jumped I heard a suction of a vessel sinking, and the submarine had submerged entirely, leaving the crew of the *Belgian Prince* struggling in the water.

"I commenced to swim toward the *Belgian Prince*, which I could see faintly in the distance, it not being very dark in this latitude at this time of night. I am a good swimmer, and swam practically all night on my back and in other positions. One of our crew, who was without a lifebelt—I do not know his name—kept about 5 yards from me for about half an hour after the submarine submerged. This man finally became exhausted and sank. I heard numerous other cries for help from our men, but could not see them.

"Later I heard a whirring noise something like an airplane, and smelled the odor of gasoline, which I thought was the submarine returning toward the *Belgian Prince* to pick up her four men. When day broke there were lots of dead bodies of my old shipmates floating around me. Then, about 5 o'clock, as near as I can judge, I made out the *Belgian Prince* and four men coming over her side. They had been lowering some stuff off the *Belgian Prince* into the boat alongside.

"I cried out, 'Help, help,' but they paid no attention to me. At this time the submarine came to the surface about 50 yards from the *Belgian Prince*, and the four men from the *Belgian Prince* approached the submarine in their boat, and they hoisted some stuff out of the rowboat and put it on board the submarine, and about 10 minutes afterward she submerged, leaving one man in the lifeboat, the other three having gone on board the submersible.

"As the submarine submerged I heard a great explosion, and the *Belgian Prince* broke in two and sank. I saw a vessel approaching from a far distance, and she gradually approached me. She came within 100 yards of me, close to where the *Belgian Prince* had sunk. She passed me, proceeded some little distance, turned around and came back and picked me up, at which time I was just commencing to lose consciousness. As soon as I revived I made a full statement of the sinking of the *Belgian Prince*, and the drowning of her crew, to the captain of the boat that picked me up, which was a British patrol boat.

"It appears that the man whom I mentioned as having been left in the rowboat, when the submarine submerged, was picked up by the British patrol boat after I became unconscious; also the chief engineer of the *Belgian Prince*, who had gotten hold of a log after the submarine first submerged, and thus had saved his life, was picked up. We were taken by the British patrol boat to Londonderry, Ireland. After we landed at Londonderry I was in a hospital for eight days, recovering from my experience in the water.

"While I was in the hospital they kept the man who was picked up out of the lifeboat, and who was a Russian and a member of the *Belgian Prince's* crew, in confinement in Londonderry until I recovered sufficiently to give a statement to the British officials, the Russian having told a somewhat different story, which they could not believe until I corroborated it in most of its particulars. I believe the reason they waited for my story was that they could scarcely believe from the Russian that the Germans would do such a thing."—*N. Y. Times*, 8/10.

U. S. DESTROYER TORPEDOED.—German submarines have scored their first hit against the United States Navy, which has been operating in European waters for more than five months. An American destroyer was struck October 16 by a torpedo, according to an official announcement October 17 by Mr. Daniels, Secretary of the Navy. One American bluejacket was killed and five were injured, but not seriously.

The destroyer was not sunk. Se made port safely.

The destroyer was struck while on patrol duty. The bluejacket killed was blown overboard.

Gunner's Mate Osmond Kelly Ingram was the man killed. His body was not recovered. Ingram's mother, Mrs. Betty Ingram, lives at Pratt City, Ala.

The wounded are Herman H. Pankratz, gunner's mate, St. Louis; William E. Merritt, seaman, New York City; Frank W. Kruse, fireman, Toledo; Patrick Rutledge, oiler, New York City, and William Seiber, fireman, Dundas, Minn.—*N. Y. Herald*, 18/10.

U. S. DESTROYER OPERATIONS.—In the five months of active service that they have seen in the war the American destroyers have steamed, collectively, a total distance of 875,000 miles. This is more by several times than the distance cruised in two whole years of peace. And what makes the figures all the more impressive is that they have been reached without the loss, through an accident of war, of a single life or a very serious mishap to any of the units.

Roughly, the destroyers have spent five-eighths of their time at sea, and their average time in port has been three days after each turn of five or six outside.

Clear weather and long days have favored them and aided the men in learning the technique of their business of combating the submarines, convoying troopships and merchantmen, patrolling the shipping routes and rescuing survivors from torpedoed ships.

The Americans, therefore, can claim no small part of the credit for the gradual decrease in shipping losses. First of all, the addition of their units to the allied forces, patrolling, as they do, an area as large as that

bounded roughly by the great V formed by New York, Detroit and Knoxville, was certain to make life less comfortable for the U-boats. Next the Americans applied all the tactics of the long-experienced British, and in some instances improved on them.

All destroyers added to their equipment depth charges and other devices. Then the crews learned some more about the business of smoke screening a merchant fleet while they beat off the attacking submarine with gun fire and depth charges. Their gunnery, too, has greatly improved. One crew saw a spar of a sunken ship the other day, which they at first thought was a periscope and shattered it at 2000 yards.

New ideas also have been and are constantly being worked out, with a view to rendering the work of the submarine increasingly difficult. Filled with enthusiasm over each new experience had with the enemy, the Americans are not slow to apply a more effective method of dealing with him the next time he shows his head above water. For instance, two officers working on designs for new destroyers, have introduced many new ideas gained from observations made in this anti-submarine game. Still others have suggested changes in gun firing. In fact, something new, although not always practicable, is being worked out all the time.

In the period of active service over here each destroyer has taken many turns at patrol duty. This means five or six days away from port, in varying kinds of weather, when the routine is "eat, sleep, stand watch and get seasick." Occasionally this routine is broken by the call to general quarters, usually caused by the presence of a U-boat or crew of a torpedoed ship.

Every destroyer has to its credit at least one encounter with a submarine, while some of the more fortunate have stalked two or three underwater craft. At no time, however, have the submarines shown fight. They always avoid a meeting.

The depth charges are feared most by the U-boat commanders. These weapons, as announced recently by the American Navy Department, are high explosives timed to explode by water pressure at the desired depth. Naval officers make no secret of the effectiveness of this new-found antidote for the submarines.

The wide cruising radius of the American boats also has helped to produce unmistakable signs of a weakening in the morale of the U-boat crews. They have made the U-boats spend more time under water than formerly. There is not so much destruction of ships by gunfire and bombs as formerly. The augmented destroyer patrol has made the submarines use up more torpedoes, with the result that they have to return to their base more frequently for reloading.

When not patrolling the shipping lanes the destroyers have been convoying food and supply ships and transports. An assignment to convoy American troop ships is welcomed by the men. It is a special job and takes them away from the routine of ordinary patrol and convoy work. Also it stimulates interest among the rank and file of the ship's company, many of whom feel that relatives and friends are on the transports.

The destroyers also have taken laurels in the humanitarian task of rescuing survivors of torpedoed ships. The Americans began snatching torpedoed crews from watery graves the day of their arrival, and for a long time not a week passed without several destroyers accounting for survivors.

The rescue work is more often than not done in mine-infested areas and places where U-boats are known to be lurking, and is always attended by grave danger to the rescuer. Frequently, while one destroyer is picking up survivors, another will run protecting circles around the scene. More often, however, the hazardous work is done single-handed, the destroyer guns booming into space as a warning to submarines not to attempt to interfere while the survivors are being lifted on board by the strong arms of the bluejackets. In tempestuous weather this work puts the men's qualities of seamanship to a severe test.—*N. Y. Times*, 17/10.

PACIFIC

GERMAN SEA RAIDERS.—Two German commerce raiders, manned by the crew of the famous *Seeadler,* which it now develops stranded on Mopeha Island, in the South Pacific, after roaming the seas for seven months, preying upon American and allied shipping, are operating somewhere in the South Seas, according to a report received October 5 at the Navy Department from the commander of the naval station at Tutuila, Samoan Islands.

The dispatch, transmitting the story of Captain Hador Smith of the American schooner *C. Slade,* one of the *Seeadler's* victims, was received September 29, several weeks after the two raiders left Mopeha Island where they had been captured by the Germans. The first put to sea on August 21 and the other on September 5, and it probably was their operations which led to recent reports of raiders in the Pacific.

Before coming to grief on August 2, the *Seeadler* had added the American schooners *A. B. Johnson, Manila* and *Slade* to the list of at least 12 allied vessels which she sank early this year in the South Atlantic Ocean.

In the long period from last March, when she was last heard from, the raider probably sent down other craft encountered in passing through the Atlantic, around Cape Horn and across the Pacific to the Society group of French Islands, of which Mopeha is one.

The *Seeadler,* according to Captain Smith's report, arrived at Mopeha on July 31. Two days later she stranded on the island, and was abandoned as a total loss, the master and crew, with 27 white men and 17 native prisoners, making shore in safety.

The company remained there until August 21, when the *Seeadler's* master, accompanied by three officers and two men, put to sea in a motor sloop with machine guns, rifles, bombs and about two months' supplies.

The remainder of the crew stayed on the island until September 5, when the French schooner *Lutece,* bound out of Tahiti, Society Islands, arrived at Mopeha and was seized.

The schooner was equipped with machine guns, rifles and bombs, and the Germans immediately put to sea in her.

The *Seeadler's* prisoners, of whom Captain Smith was one, were left on the almost desolate island, but, on September 19, Smith and three others of the prisoners departed in an open boat and reached Tutuila 10 days later. Smith reported the prisoners badly in need of food and water.

The dispatch from the naval officer did not indicate the size of the raiders, and nothing is known of them, as one was unnamed, while the French schooner *Lutece* is not listed in available shipping records.

First news that the *Seeadler* had slipped past the British cordon in the North Sea and was preying on shipping in the Atlantic came on April 1, last, in dispatches from Rio de Janeiro, giving the names of 12 allied craft, sail and steam, that she had destroyed.

Word of the sinkings was carried to the Brazilian port by the French bark *Cambronne,* which was sent there by the *Seeadler* with the crews of the destroyed ships.

According to some of the survivors, the *Seeadler's* master said he left Germany on December 22 and passed as a Norwegian sailing ship.

The *Seeadler* had three masts and was equipped with a powerful auxiliary engine. She carried two guns of 105 millimeters and 16 machine guns, with a crew of 64, under command of Count Ukner.

The vessel also was equipped with a powerful wireless concealed in the rigging.

The raider flew the Norwegian flag until close to her intended victims, when her sails were lowered, the German flag run up, and fire opened with machine guns.

Raiding parties boarded the ships, transferred the crews and papers, and then sank the prizes with bombs.

One report among the survivors at Rio Janeiro was that the *Seeadler* was the captured American bark *Pass of Balmaha*, of 1577 tons, which was taken into Cuxhaven by a German prize crew in August, 1915, while on a voyage from New York to Archangel with 5000 bales of cotton.

She was first held up by a British cruiser, which placed a prize crew on board. Subsequently a German submarine overhauled the bark and put a prize crew on her. The Germans did not know there was a British prize crew aboard, they said, until the Englishmen were discovered in hiding. The vessel was confiscated by a German prize court because she was carrying contraband to an enemy country.

The American schooner *A. B. Johnson* was 529 tons gross and was owned by Wilson Brothers and Company, San Francisco. She was built at Aberdeen, Washington, in 1900.

The American schooner *Manila* registered 731 tons gross and was owned by John A. Hooper, San Francisco. The vessel was built at North Bend, Oregon, in 1899.

Shipping records do not mention the American schooner *C. Slade* or the French schooner *Lutece.*—*Washington Post*, 5/10.

SEARCH FOR RAIDERS.—With definite information of the presence of two German sea-raiders in the South Pacific Ocean, announced in dispatches from Samoa to the Navy Department, a hunt for the commerce destroyers has been begun.

British, Japanese and American warships will scour the South Pacific for the two German raiders.—*N. Y. Herald*, 6/10.

BOAT CREW FROM "SEEADLER" CAPTURED.—An Exchange Telegraph dispatch from Melbourne says it is reported there that a whaleboat with a crew of Germans from the raider *Seeadler* has been captured in the vicinity of the Fiji Islands. The boat contained a gun and machine guns, the dispatch says, and the Germans admitted they had been detailed from the *Seeadler* to make raids.—*N. Y. Herald*, 9/10.

"SEEADLER" PASSED BRITISH CRUISER'S INSPECTION.—Details of how the famous German commerce raider *Seeadler*, which preyed on allied commerce seven months in the South Pacific before meeting her fate on the reefs of Mopeha Island, passed inspection of a British cruiser by assuming the disguise of a lumber carrier, were revealed by Captain Hador Smith, master of the American schooner *R. C. Slade*, one of the known victims of the German craft.

After capture by the British and subsequent escape, the *Seeadler* put into Bremerhaven, a German port, and in December, 1916, fitted out as a motor schooner under command of Lieut. Von Luckner and a crew of 68, half of whom, according to Captain Smith, spoke Norwegian.

With forged Norwegian clearance papers and two 4-inch guns concealed by a deckload of lumber, the vessel put to sea, encountered a British cruiser, passed inspection, mounted her guns, and proceeded to sink 13 vessels in the Atlantic, two of them Britishers, Captain Smith said.

The final capture in the Atlantic was a French bark on which 300 of the *Seeadler's* prisoners were put and sent to Rio de Janeiro. The *Seeadler* escaped pursuers and rounded Cape Horn, immediately beginning a campaign of destruction in the South Pacific.

Depredations of the *Seeadler*, a converted American vessel, were announced by the Navy Department October 4.—*Washington Post*, 13/10.

NORTH SEA AND CHANNEL

BRITISH SHIPS BOMBARD OSTEND.—British warships bombarded the German naval works at Ostend with satisfactory results, September 22, it was announced by the British Admiralty. Three German seaplanes were shot down by British airplanes. The Admiralty statement reads:

"Naval works at Ostend were this morning, September 22, bombarded by ships of our Belgian coast patrol with satisfactory results. Three seaplanes attempting to assist the enemy by observation were shot down by our air patrol."

"On Thursday night, September 20, and Friday morning, September 21," says an official statement issued by the British Admiralty, "bombing raids were made by our naval aircraft on the following military objectives: Aertyoke, Sparappelhoek and Thourout airdromes and the Thourout railway station. Bombs also were dropped near the Atelier de la Marine at Ostend. A large quantity of bombs was dropped, with good results.

"The bombers were attacked by numerous enemy aircraft which were driven off with the assistance of the Royal Flying Corps patrol. All our machines returned safely."—*N. Y. Times*, 23/9.

BRITISH DESTROYER SUNK BY SUBMARINE.—A British destroyer has been torpedoed and sunk by a German submarine in the approaches to the Channel, according to an Admiralty announcement. There were 50 survivors.—*N. Y. Herald*, 24/9.

OFFICIAL PHOTOGRAPHS EXPOSE GERMAN REPORT CONCERNING SHELLING OF OSTEND.—The German official report saying that during the bombardment of Ostend, Belgium, on Saturday, September 22, shells had struck the cathedral, killing seven persons and wounding others, is refuted in an official statement from the British Admiralty, which declares that photographs taken of the bombardment show no signs of the cathedral having been hit. The Admiralty statement follows:

"In reference to the German wireless message reporting that an English monitor had bombarded Ostend and that a few shells had struck the cathedral killing seven and wounding twenty-four Belgians, a careful examination of photographs taken at Ostend after the bombardment shows no signs of a hit on the cathedral.

"On the other hand, the photographs indicate clearly that one floating dock has sunk and keeled over, that one workshop in the dockyard has been demolished completely and that seven others were damaged. A portion of one submarine shelter is shown to be missing."

The official statement from German General Headquarters on Sunday, September 23, regarding the bombardment of Ostend, said:

"Yesterday morning a British monitor, assisted by aerial observers, bombarded Ostend. A few shells struck the cathedral, in which early mass was being held. Seven Belgians were killed and twenty-four wounded seriously. The monitor was driven off by the fire of our coast batteries."—*N. Y. Herald*, 25/9.

GERMAN AIR RAID OF SEPTEMBER 24 AND 25.—Another hostile airplane raid on London took place to-night, September 25. There were two attacks apparently, for, after a 40 minutes' quiet interval, anti-aircraft guns resumed firing in the London district.

In the first attack, after brisk firing by the defensive guns, lasting only 10 minutes, the raiders were driven off without succeeding in reaching the city of London.

A report of the raid was issued by Field Marshal French as follows:

"The Thames estuary was again the object of a hostile air raid September 25. The Kent and Essex coast was crossed at various points and a few bombs were dropped, but no casualties as yet reported.

"One raider penetrated as far as the southeastern outskirts of London, where two bombs fell, causing some 20 casualties."

Fifteen persons were killed and seventy injured in Monday night's air raid over London.

The Zeppelins which crossed the Yorkshire and Lincolnshire coasts did not penetrate inland, being driven off by gunfire. Three women were

AERIAL VIEW OF THE CANAL LOCKS AT ZEEBRUGGE. THE ALLIES HAVE AERIAL PHOTOGRAPHS OF GERMANY'S BASES, WITH THE MOST IMPORTANT PLACES MARKED

Flying, October

injured. Only two airplanes at the most penetrated the defences of London last night, it is reported officially.

The following official report was given out by Lord French, commander of the home defences:

"Airplane raid: The latest reports concerning last night's airplane raid show that the group of raiders which approached London were driven off by the fire of anti-aircraft guns. Only one, or at the most, two machines, penetrated the defences. The casualties in all the raided districts reported by the police up to the present are: Killed, 15; injured, 70. The material damage was not great.

"Airship raid: Enemy airships crossed the Yorkshire and Lincolnshire coasts between midnight and 3 a. m. There is no evidence of their having penetrated to any distance inland. They were driven off by the gunfire from various defended localities which they attempted to approach. Bombs were dropped at one coast town, three women being slightly injured. Little damage was caused."—*Washington Post*, 26/9.

GERMAN STATEMENT.—One of the German aeroplanes which took part in last evening's, September 25, raid over England has not returned, it is announced officially. The raiders, the statement says, attacked London and the English coastal towns "on both sides of the Channel."—*N. Y. Herald*, 27/9.

RAID OF SEPTEMBER 28.—Two German aeroplanes which took part in last night's, September 28, raid over the southeast coast of England were brought down, it is announced officially. No casualties were caused by the raid.

The following official announcement was made:

"Lord French, commander of the home defences, reports that the latest information indicates that about 20 enemy machines participated in last night's raid. Bombs were dropped in a number of places in Kent, Essex and Suffolk, but no casualties, and only insignificant damage, have been reported up to the present. Repeated attacks were made on London, but in no case did the raiders penetrate the outer defences.

"One enemy aeroplane is reported to have been shot down in the Thames estuary, and a second one off the coast."

The successful operation of the British aerial defences in the frustration of three attempts of German raiders to reach London last night, September 28, and the destruction of at least two Gothas on the coast, lead to the hope that means have been found to deal with moonlight visitors, as the Zeppelins were countered last year. It is true that the condition of the sky last night was not altogether favorable for night flying, but the defence by airplanes and anti-aircraft guns has been made so strong that future raiders will cross the coast of England at their own peril.

The situation, combined with the continued attacks by army and navy flyers on German airdromes in Belgium, is expected at any rate to limit the activities of the Germans, whose only success during the week has been the killing of a number of innocent civilians. Not the slightest military damage was done.—*The Baltimore News*, 29/9.

BRITISH SEAPLANES BOMB BELGIAN COAST.—British seaplanes again dropped many tons of bombs on German military establishments in Belgium on Tuesday night, September 25. An official statement issued by the Admiralty says:

"On Tuesday night, September 25, our naval airplanes dropped many tons of bombs, making several direct hits on the railroad lines at the Thourout junction, the Lichtervelde junction and the Cortemarck junction. All our machines returned safely."—*Washington Post*, 26/9.

British aviators dropped seven tons of explosives in attacks Thursday night, September 27, on German military establishments in Belgium. The following official report was given out to-day by the Admiralty:

"On the night of September 27-28 there were bombing raids by naval aircraft on the following objectives: The lock gates at Zeebrugge, the St. Denis Westrem aerodrome, the Gontrode airship shed, the Houttave aerodrome."—*The Baltimore News*, 29/9.

GERMAN AIR RAID OF SEPTEMBER 29.—Hostile aeroplanes raided London again September 29. An official communication from the Home Office on the latest raid says:

"Hostile aeroplanes crossed the coasts of Kent and Essex in groups between eight and nine o'clock. Several attacks were made on London, and some bombs were dropped in the northeastern and southeastern districts. Bombs also were dropped at various places in Kent and Essex. No reports of casualties yet have been received."

Two German aeroplanes which took part in Friday night's raid over the southeast coast of England were brought down, it is announced officially. No casualties were caused by the raid.

The successful operation of the British aerial defences in the frustration of the three attempts of the German airmen to reach London leads to the hope that means have been found to deal with moonlight raiders as the Zeppelins were countered last year. It is true that the condition of the sky last night was not altogether favorable for night flying, but the defence by aeroplanes and anti-aircraft guns has been made so strong that future raiders will cross the coast of England at their own peril.

This situation, combined with the continued attacks by army and navy flyers on German airdromes in Belgium, is expected at any rate to limit the activities of the Germans, whose only success during the week has been the killing of several innocent civilians. Not the slightest military damage was done.

The following official announcement was made:

"Lord French (commander of the home defences) reports that the latest information indicates that about 20 enemy machines participated in last night's raid. Bombs were dropped in a number of places in Kent, Essex and Suffolk, but no casualties, and only insignificant damage, have been reported up to the present. Repeated attacks were made on London, but in no case did the raiders penetrate the outer defences.

"One enemy aeroplane is reported to have been shot down in the Thames estuary and a second one off the coast."—*N. Y. Herald*, 30/9.

THREE GERMAN AVIATORS INTERNED IN HOLLAND.—A German aeroplane of the Gotha type descended near Sas Van Gent, in Zeeland, this morning, September 29. One if its three passengers was severely wounded. The two unwounded passengers attempted to escape to the frontier but were caught, and all three will be interned. The machine was armed with three machine guns and had six bombs on board.—*N. Y. Herald*, 30/9.

GERMAN AIR RAID OF SEPTEMBER 30.—German aviators bombed inner London, Margate and Dover last night, September 30, according to the official statement issued by the German War Office. All the German machines, it was added, returned unharmed.

The text of the announcement reads:

"Our airmen again dropped bombs upon military buildings and warehouses in inner London. Numerous fires showed that this attack was particularly effective. Other aeroplanes successfully attacked Margate and Dover.

"All our machines returned unharmed."—*N. Y. Herald*, 2/10.

British Statement.—"Latest reports show that a determined and simultaneous attack was made upon London by three groups of raiders. Each of these groups, which approached from different directions, was broken

up by anti-aircraft gunfire, and only two, or at the most three, machines penetrated the defences. Bombs were dropped in the northeastern and southeastern districts. A fourth group of enemy machines which attempted to approach London later was driven off, none of the raiders penetrating the outer defences of the capital.

"Bombs also were dropped at various places in Kent and Essex."—*Washington Post*, 1/10.

DUNKIRK RAIDED.—A French official report tells of recent bombardments of Dunkirk, in which civilians were killed, and of attacks by French aeroplanes on the German lines. It says:

"German aeroplanes bombed the region of Dunkirk on September 27, 28 and 29. The first two bombardments caused only material damage. The last, which was particularly violent, caused several casualties among the civilian population. Two German machines were brought down by our pilots on September 29.

"On the night of September 28 our aeroplanes bombed the station at Colmar and enemy establishments north of Soissons, dropping 4000 kilograms of projectiles with success."—*N. Y. Herald*, 1/10.

GERMANS KILL 864 IN AERIAL RAIDS UPON BRITISH SOIL.—German aircraft have made 33 disastrous raids over England since January, 1915, inflicting a total loss of life of 864 persons. The list of principal raids follows:

1915	Killed	Injured
January 19	4	...
May 13	6	...
June 6	24	...
June 15	16	...
August 9	14	...
August 12	6	...
August 17	10	...
September 7	13	...
September 8	20	...
October 13	56	144
1916		
January 31	61	101
March 15	12	33
March 31	43	66
April 1	16	100
May 2	36	...
August 9	6	17
August 24	8	36
September 2	2	13
September 23	38	125
September 24	36	27
1917		
May 24	76	174
June 5	2	29
June 13	97	439
July 4	11	36
July 7	37	141
July 22	11	26
August 12	32	43
August 22	11	13
September 3	108	92
September 24	15	70
September 25	7	26
September 29	11	82
September 30	9	42
October 1	10	38

—*Washington Star*, 2/10.

DUNKIRK BOMBARDED OCTOBER 1 AND FRENCH RETALIATE.—The German cities of Frankfort-on-the-Main, Stuttgart, Treves and Coblenz were bombarded last night, October 1, by French aviators in retaliation for German aerial attacks on French cities.

The following official announcement was given out:

"The Germans last night made a new attack on the town of Dunkirk. The bombardment was very violent, causing serious material damage. It is reported there were numerous victims among the civilian population.

"In reprisal for the bombardments carried out by the Germans against Bar-le-Duc and Dunkirk, our aviators last night threw down bombs on the towns of Frankfort-on-the-Main, Coblenz, Treves and Stuttgart.

"Our bombarding airplanes made numerous expeditions, in the course of which 2120 kilograms (4664 pounds) of explosives were thrown on military buildings in Roulers and 6000 kilograms (13,200 pounds) on the railway

stations at Metz-sur-Woippy and Thionville, the airdrome at Chambley, encampments at Spincourt and Tilly and munition depots at the Longeau farm, where a violent explosion was observed.

"Two German airplanes were brought down October 1 by our pilots and four others were compelled to land in a disabled condition."—*Washington Star*, 2/10.

GERMAN AIR RAID ON LONDON, OCTOBER 1.—The strongest air attack yet attempted on London and the coast towns by the Germans was carried out during the night of October 1 by four groups of hostile aeroplanes. Some of the machines got through to London and bombed the southwestern district.

A terrific barrage was sent up from the defence guns and the roar of battle lasted intermittently for two and a half hours.

The Germans bombed coast towns as they passed over and proceeded toward London. Two of the groups succeeded in getting machines through the sky barrage. Numerous bombs were dropped on the southwestern district, which is thickly populated with the homes of the upper and middle classes. The fire from the defending guns was longer and louder than ever before. A rain of shrapnel fell in all sections of the town, and the streets were virtually deserted save for a few police.

The weather was perfect for air operations, as there was a bright full moon, with no clouds or wind. The people of London expected a raid and were waiting for signals. Soon after seven o'clock motors of the volunteer corps sped through the streets blowing their sirens and displaying an illuminated notice, "Take cover!" The telephone exchanges notified their subscribers, and other measures were put into execution to inform the populace of the raid.

Field Marshal Lord French, commander-in-chief of the home forces, issued the following report last night:

"A group of hostile aeroplanes crossed the Essex coast at seven o'clock this evening, October 1, and proceeded across Essex toward London.

"This group of machines was followed at about a quarter of an hour's interval by a second group, which pursued the same course.

"The first attack on London was delivered from the northeast about a quarter to eight o'clock p. m. Most of the raiders were turned back, but one or more of the machines penetrated the defences and dropped bombs in the southwestern district.

"About 8.15 p. m. the second group of raiders attempted to cross the defences at various points in northeast and north London, but without success until shortly after nine o'clock, when a few of the machines passed across London and bombs were again dropped in the southwestern district.

"Meanwhile a third group of raiders crossed the Kentish coast and dropped bombs at various places. This group did not penetrate very far westward.

"A fourth group of enemy machines crossed the Essex coast about 8.50 o'clock and proceeded toward London, which was approached shortly before 10 o'clock. They did not penetrate further than the northeast outskirts of London, where some bombs are reported to have been dropped.

"No reports of casualties or damage have yet been received."—*N. Y. Herald*, 2/10.

An official statement issued October 2 on the aerial operations says:

"In the airplane raids of the last eight days all of our pilots have landed safely.

"Lord French reports that the latest police reports state that in last night's October 1, air raid the casualties in all districts visited by the raiders were: Killed, 10; injured, 38."—*N. Y. Herald*, 2/10.

ZEEBRUGGE RAIDED OCTOBER 3.—"Naval aircraft, October 3, bombed St. Denis, Westrem, the Zeebrugge lock gates, the Bruges docks and other

targets, and the Thourout railway junction," says to-day's official report on the British aerial operations over Belgium. "All the machines returned safely."—*N. Y. Times,* 5/10.

FIVE U-BOATS DESTROYED.—Further details of daring encounters between British aviators and enemy airmen and submarines are contained in the official records of the Admiralty. The report of a squadron commander in the royal naval air service, who has been flying for the last 18 months on the battle front, tells a thrilling story of attacking 10 Gotha machines, single-handed, 12,000 feet in the air. He fired 100 rounds behind one of the enemy flyers at 100 yards' range. After the German machine began a slow spin, the squadron commander fired 25 more rounds to make sure of his purpose. His gun then jammed and he became involved in a fast spin, but recovered in time to see his enemy crash to the ground.

The Britisher then landed and repaired his machine gun and went up after the remaining Gothas. At 14,000 feet he engaged the enemy machines in turn from above and below, finally devoting his attention to one at which he fired 200 rounds and silenced both its guns and probably hit the gunners. The British flier, now being out of ammunition, descended.

Another report tells of how two British seaplanes, patrolling above the North Sea, sighted a submarine traveling about 14 knots an hour, with two men in the conning-tower. The seaplanes swooped down to a height of 800 feet, one dropping a bomb, which burst on the starboard side of the submarine half way between the conning-tower and the stern. The submarine slowly heeled to port, the bow arose and the craft began to sink.

The other seaplane then dropped a bomb which burst in front of the conning-tower, and as the submarine sank another bomb was dropped. The seaplanes circled the spot for a quarter hour in search of survivors, but none appeared.

On another occasion a seaplane while on air patrol overhead a hostile wireless signal and soon after sighted a large submarine lying on the surface a mile ahead. Flying at a rate of 80 miles an hour the seaplane darted over the enemy who fired a round from his foremost gun. The shell burst 50 feet ahead of the seaplane, but the bomb which the British flyer dropped exploded and tore a great hole in the submarine. As the enemy craft sank, flames spurted from the water.

Then three more submarines were sighted, reinforced by three hostile destroyers and two seaplanes. All opened fire on the British seaplane which turned and flew over the spot where the stricken submarine had disappeared. A second bomb was now dropped and its explosion brought up a quantity of wreckage. His supply of bombs being exhausted the British aviator returned to his base, but first took a photograph of the enemy destroyers and seaplanes.

The Admiralty records show that recently honors do not rest only with the fliers of the navy. They relate how a division of destroyers, patrolling in the North Sea, sighted a submarine and dashed forward at full speed. The war vessels crossed over the submarine just as its dived, and dropped explosives on the spot. A large, dark object came to the surface and then promptly sank, the wreckage and oil at once appearing.

In another incident, several destroyers while accompanying light cruisers sighted a small sail on the horizon which turned out to be a submarine. One destroyer altered its course toward the submarine which had dived, but soon raised its periscope and then again dived within 10 seconds. The destroyer went at full speed for the spot. The submarine's bow suddenly broke the surface a half mile away, showing the conning-tower and large vertical rudder. The war vessel then rammed the underwater boat while going at a speed of 30 knots. The enemy craft sank vertically, bubbling like a gigantic empty bottle, in more than 100 fathoms of water.—*N. Y. Times,* 6/10.

BRUGES BOMBED OCTOBER 15.—Tons of bombs were dropped on the docks at Bruges, in Belgium, on Monday night, October 15, by British naval airplanes. The British Admiralty, in a statement announcing the raid, says:

"Naval aircraft dropped many tons of bombs on the Bruges docks on Monday night. On Tuesday, October 16, one of our fighter patrols downed a double-seater enemy machine in the vicinity of Zarren. The observer fell out and the machine turned over and fell in flames. All of our machines returned."—*N. Y. Herald,* 18/10.

GERMAN MINES FAILING.—The *Sun* correspondent, under an unusual privilege granted by the Admiralty, went out into the North Sea, and saw at first hand an evidence of the force which has made that body of water a place of terror for the German Navy. British naval forces of every description have worked with such good results that they have made enemy traffic impossible on the surface, while the U-boats are finding increasing difficulties in getting through the various defences built up during the past year.

There has been no previous time since the war started when the British felt a more complete sense of mastery over the Germans than during these autumn days, when daily reports show the tremendous decline in enemy activities. German mines, that formerly made England's coast one long death trap for small vessels, grow fewer all the time, are laid in worse fashion and do not conform to their erstwhile system.

Enemy destroyers no longer venture far beyond their harbor entrances, having abandoned their old methods of dashing out for the ineffectual shelling of British coast towns. Their old refuges along the Belgian coast have been made untenable under the continual bombardment from sea and air.

Finally, doubly to insure complete control of the waters accessible to Germany, Great Britain has established a fleet of submarines whose power is unsuspected even by the Englishmen themselves. These undersea craft are manned by the best type of picked British sailors, who undoubtedly have done more than their share to make the North Sea a graveyard for German shipping. They have wiped out many old scores during the last six months, and for every wrecked British or neutral vessel whose rotting hulk is on the ocean bed Germany will pay double.

Britain's submarines have been built so swiftly and in such numbers that they have been able to maintain a continual patrol over the lines which the German Navy might use. They also have laid mine fields to insure the further bottling up of enemy craft of all classes. British sea forces have worked consistently and cooperated untiringly to attain such indescribable heights of power. It is not surprising that the enemy seamen revolt at the prospect of meeting such opponents.—*Baltimore News,* 15/10.

NEW GERMAN CRUISER STRIKES A MINE.—Arrivals at Amsterdam from Hamburg, says a dispatch to the Exchange Telegraph Company, report that in the early part of the week ending Octobe 6, a new German battle cruiser, while on a trial run off Heligoland, struck a mine and was seriously damaged.

Three officers and 27 men were drowned. The vessel was towed to port.

Since the war began, Germany is known to have laid down two battle cruisers, both completed in 1916 or early in 1917. One is the *Hindenburg,* and the other the *Ersatz-Viktoria Luise,* or *Viktoria Luise II.* The first was built at Wilhelmshaven and the second at Danzig.

They are sister ships, and photographs show them to be similar in appearance to the *Derfflinger,* 28,000 tons, believed by the British Admiralty to have been lost in the battle off Jutland, May 31, 1916.

The two new battle cruisers were designed for a displacement of 27,600; water-line length, 698 feet; beam, 95¾ feet; mean draft, 27 feet; and to have a complement of officers and men of 1100.

Each armament was to be eight 12-inch, twelve 5.9-inch, twelve 3.4-inch; anti-aircraft guns, and four or five submerged torpedo tubes.—*N. Y. Times*, 9/10.

DAMAGED U-BOAT SIGHTED.—A large submarine was observed from Copenhagen, October 10, passing through the little belt southward in a badly damaged condition.

Both port and starboard quarters and the stern of the submarine gave evidence of a severe engagement.—*N. Y. Times*, 10/10.

RED FLAG ON GERMAN BATTLESHIPS.—The *Telegraaf* learns that the Wilhelmshaven mutiny occurred aboard the battleships *Kaiser, Westfalen, Prinz Regent Luitpold* and the *Hamburg*. The sailors hoisted the red flag on these vessels and none responded to the roll call.

The officers rushed forward with revolvers threatening to kill any sailors who refused to obey. The sailors then threw overboard several officers, including the commander of the *Prinz Regent Luitpold*.

Some guns were thrown into the sea.—*Washington Post*, 17/10.

BALTIC

RUSSIAN FLEET BOMBED.—During the week ending September 1 the enemy carried out a series of air raids on various islands in the Gulf of Riga and in the entrance to the Gulf of Finland, dropping about 90 bombs on the ships of the fleet and on harbor works. Russian naval airmen had a series of aerial engagements with the enemy. Enemy ships, torpedo-boats and submarines, have been seen in the vicinity of the Russian coasts, while enemy trawlers have operated at the entrance to the Gulf of Riga.—*The Army and Navy Gazette*, 8/9.

ACTIVITIES IN THE BALTIC.—The sudden withdrawal of the Russians from the Riga front may be due as much to the threat from the sea as to the advance of the Germans on land. It seems fairly clear from the reports of the last few days, meager though they are, that Germany is making what may be called a double thrust at the Russian defences in this direction. There have been stories of "liveliness" afloat and much activity in the air, particularly in the direction of the islands of Oesel and Dago. These islands may be regarded as outposts to the Gulf of Finland as well as to the Gulf of Riga, and it must be highly desirable from the German point of view to eliminate them as factors in the defence. In the fighting in the Gulf of Riga in August, 1915, when a German naval force attempted to force the entrance to the Gulf, several engagements took place near Oesel Island, and although the Germans denied that they lost the vessels claimed by the Russians, they were at least obliged to abandon their purpose. In May, 1916, the Germans renewed their attempt to gain possession of the Gulf of Riga, and their aircraft attacked the Russian aerodrome at Papenholm on the island of Oesel.

At that time Admiral Kanin was in command of the Russian Baltic fleet, and not only did the German attempts fail, but the Russian ships cooperated with the right wing of their army in bombarding the enemy's lines. In an interview which the admiral gave to Mr. Hamilton Fyfe in June of that year, he spoke of the greatly increased strength of the navy, and, referring to the enemy's failure at Riga in the summer of 1915, Admiral Kanin said, "We kept them off then, and I am confident we shall be able to keep them off now that we are so much better equipped." In October of 1916 Admiral Pepenin succeeded Admiral Kanin, and a month later, when German torpedo craft attempted a raid into the Gulf of Finland,

these were repulsed with heavy loss. To what extent the political upheaval in the spring has affected the efficiency of the fleet, or unfitted it for action, it is impossible at present to determine. When the revolutionary movement took place, which culminated in the abdication of the Czar on March 13, it was at first stated that the Baltic fleet had taken no part in it. This welcome statement turned out, however, to be untrue. As a fact, a terrible mutiny broke out, in the course of which many valuable officers lost their lives. Something like a state of anarchy obtained, and it is uncertain how far order has been restored and the reorganization of the ships as a fighting force carried out. Admiral Koltchak in May, in a report on the situation, said that the absence of discipline was especially noticeable in the Baltic fleet, where confusion and mistrust prevailed. About the same time increasing German naval activity was manifest, especially off the entrance to the Gulf of Bothnia, and it was believed in Petrograd that this movement was in the nature of a feint to cover a descent on the right flank of the Russian forces in the Gulf of Riga, or possibly an enterprise directed against the island of Oesel.

At a moment, therefore, when the Russian fleet was more or less in a state of disorganization, the situation once more became menacing. In June the Russian *communiqués* admitted daily attacks by enemy aeroplanes upon the artillery sheds and vessels in the roadstead at Oesel, none of which, it was claimed, achieved material results. Some units of the fleet and of the air service appear to have offered an obstinate and resolute opposition to the enemy, and there were signs of a patriotic and zealous performance of duty. Indeed, although certain of the battleships' crews were said to have issued an "ultimatum," this was declared to be unauthorized by the fleet generally, and its discipline was said to have improved. Later on, Rear Admiral Verderefsky, who appears to have succeeded to the command of the Baltic fleet on the death of Admiral Nepenin, was relieved of this duty and Rear Admiral Razvozoff appointed commander-in-chief in his stead. Apparently this officer was charged with the duty of restoring order and efficiency in the fleet, for a few days later M. Kerensky addressed a memo. to the navy with reference to the conduct of certain persons in the garrison of Kronstadt, and the crews of the battleships *Petropavlovsk, Republic* and *Slava,* ordering the arrest of the ringleaders, and stating that most rigorous measures would be taken against those acting as traitors to the country.

The Germans admitted on July 11 that when their air squadrons attacked the harbor works near Reval and Arensburg and on the island of Oesel, they were met by a most vigorous opposition from the ships and batteries of those places. On the other hand, Lieutenant Lebedeff, at that time Acting Minister of Marine, reported to M. Kerensky on August 17 that he had found one of the most powerful coast batteries in a state of profound disorganization. It was off this battery that the destroyer *Burakoff* was sunk by a German mine, and, although many signals were made to the battery for assistance, they failed to elicit any reply. It is a little difficult, in view of these conflicting reports, to estimate the strength of the resistance which the Russian Baltic fleet may offer to further offensive movements by the Germans. There is, however, a good deal of evidence supporting the idea that the advance of the German troops across the Dvina and the retirement of the Russians will be accompanied by concerted naval operations. General Korniloff, in his speech on August 28 at the Moscow Conference, referred to the danger to Petrograd if the enemy broke through on the Riga front. Such a danger would be doubly threatening if an attack from the sea was also successful. The German mine sweepers have been for a week past busily at work at the entrance to the Gulf of Riga, and a strong force of cruisers, destroyers and other vessels is believed to have pushed through the Irben passage. The loss of Riga is not in some ways such a disaster as would be the possession by Germany of the control of the waters in the Gulf. To some extent she appears to have

already obtained this, for the enemy submarines were reported on Wednesday to be bombarding some of the villages on the Livonian coast. These villages are between Riga and Pernau, and the movement in that direction may indicate an intention to overlap the right flank of the Russian Army in its new position. The possibility of a landing hereabouts, or even further north near the Moon Sound, must be expected, and if successful would constitute a serious threat to the important naval base at Reval. The fleet itself might be in peril. In view, however, of the difficulties of navigation in this part of the Baltic during the winter, it is conceivable that the Germans might attempt to occupy the island of Oesel, in preparation for a further advance in the spring and combined operations in the Gulf of Finland. For the moment the nature of the opposition which the Russian fleet is prepared to offer is in doubt, and the meaning of the German naval movements is equally uncertain. The next few days will probably show whether this activity presages a combined naval and military operation, and with what immediate object.—*The Army and Navy Gazette*, 8/9.

Since September 14 enemy activity has been intensified, characterized chiefly by aerial reconnaissances and submarine maneuvers in an endeavor to prevent our vessels from approaching the Courland coast. Near the Courland coast and in the Irbe Channel our torpedo-boats and submarines and aerial forces are preventing enemy vessels from entering our waters. Enemy activity has been observed recently on the Courland coast of the Gulf of Riga, during the night searchlight rockets and fire signals being observed. Our coast defences in the Irbe Channel were attacked by Zeppelins on the night of September 25, nearly 40 bombs being dropped.—*Washington Post*, 28/9.

RUSSIAN DESTROYER SUNK.—In the Baltic Sea Wednesday, September 26, off the southern part of the island of Oesel, the Russian destroyer *Ochotnik* was damaged and later sunk from striking an enemy mine laid by a submarine, an official statement announces.

A ship's boat containing 11 sailors, including four wounded men, landed on the coast. Motor boats and ships were dispatched in search of other members of the crew.

The officers of the *Ochotnik* refused to leave, and sank with their ship.

The *Ochotnik*, 246 feet long, of 615 tons displacement, was built in 1905. She was armed with two 4.7-inch guns and six 6-pounders. Her normal complement was 98 men.—*N. Y. Times*, 29/9.

Russian Official Statement.—"A report received September 30 shows that 43 men were saved from the torpedo-boat *Ochotnik*, the sinking of which by a mine in the Baltic Sea was announced on Friday. All the officers and men voluntarily remaining on the ship perished.

"On the southwestern front 360 pounds of bombs were dropped in various places by our light aeroplanes on enemy troops and transports. Eighteen hundred pounds were dropped by our Murometz machines.—*N. Y. Herald*, 1/10.

RUSSIAN SHIP BOMBED.—The official statement follows:

"On the Baltic Sea, on Monday night, October 4, the enemy undertook several air raids on Oesel, dropping a few bombs which set fire to one of our magazines. Explosions followed. Several officers and sailors who were extinguishing the fire, perished. As reprisals our airmen dropped bombs on camps on the Courland coast.

"At noon, on October 4, enemy trawlers appeared in the Irbe Channel. They were repulsed by our coast batteries. Enemy hydroplanes again attempted to approach Oesel, but our airmen forced them to turn back and drop their bombs in the sea."—*N. Y. Herald*, 4/10.

AGITATION IN RUSSIAN FLEET.—The provisional government has just crushed in their incipiency new seditious and mutinous agitations among the ranks of the Baltic fleet.

A series of preposterous demands had been presented by the central committee of sailors, an organization similar to those in the army, elected by the ranks.

Minister of Marine Verdervsky promptly sent back word that the provisional government could not consider for a moment granting the committee's demands. He declared that the government would combat with all its power the slightest attempt at sowing new distrust among the sailors.

He decreed the dismissal of the committee and new elections. Any agitation in the Baltic fleet against the commanders will be regarded as treason, the minister asserted.—*Washington Post,* 8/10.

GERMAN MUTINY PREVENTED EARLY ATTACK ON RUSSIA.—The inactivity of the German fleet in the Baltic Sea recently when there were obvious opportunities for attacking Russia, according to a dispatch to the *Daily Chronicle* from Amsterdam, was due to the mutinous outbreak in the German Navy.

The outbreak affected at least six important units of the fleet, putting them out of action and causing the authorities to doubt the discipline and loyalty of the crews of other large ships.

It was impossible, the dispatch adds, to take stern measures on a large scale against the offenders because that would have increased the evil.—*N. Y. Herald,* 13/10.

GERMAN OPERATIONS.—Fighting between the Russians and the German troops which landed on Oesel Island, in the Gulf of Riga, continues, according to the Russian official statement issued to-day. The Germans are pressing the Russians toward the southeast. An attempt made by a German force to capture a pier on Moon Island, between the island of Oesel and the mainland of Esthonia, was repulsed. The text of the statement follows:

"Baltic Sea.—On October 12 the enemy who landed on Oesel Island succeeded in occupying part of the island. Toward evening it was observed that enemy motorcyclist detachments were approaching Orrishaf, in the eastern part of the island, and they attempted to capture a pier on Moon Island, but were repulsed.

"The fight with enemy troops which landed still continues. Enemy advanced detachments are pressing our troops in a southeasterly direction.

"The landing of German troops on Oesel Island continued October 13. The region where the debarkation is taking place is guarded from the sea by very large enemy naval forces.

"Simultaneously with the landing on Oesel Island several enemy ships engaged our shore battery on Dago Island. According to the information to hand four enemy torpedo-boats were sunk by the fire of this battery and one enemy cruiser which was firing at this battery ran aground.

"Our battery was completely destroyed by the overwhelming gunfire from the enemy ships. This enabled the enemy to land a small detachment on Dago Island, which, however, was unable to maintain its position, and the troops promptly returned to their ships.

"Since yesterday morning, October 13, our ships have successfully hindered the enemy's naval forces entering our waters between Dago and Oesel islands.

"In the course of the engagements of the last two days our ships suffered no appreciable damage. While he has landed troops the enemy also continues the usual mine sweeping along the Courland shores of Irban Strait.

"During numerous aerial reconnaissances and engagements in the region of Oesel Island one of our aviators brought down an enemy aeroplane."

The German forces which landed on Oesel Island, in the Gulf of Riga, under the cover of 90 war vessels, had occupied up to 10 o'clock on Saturday morning, October 13, the whole northern and eastern part of the island and were within 12 versts of Arensburg, on the southern shore, according

to an announcement made by the Russian Naval General Staff. The Russians still occupy Serel Point and the Svorb Peninsula, on the southwestern coast.

Mr. Kerensky, in an urgent appeal to the Baltic fleet to defend the Fatherland "in this hour of trial," divulged the fact that the garrison of Kronstadt, the chief fortress and military port of Russia and the station of the Baltic fleet, 20 miles west of Petrograd, by its attitude already has weakened the defensive resources of the fortress.

GERMANS SWEEP OVER OESEL ISLAND

Eight dreadnoughts, a dozen light cruisers, 40 torpedo-boats and 30 mine sweepers participated in the German landing on Oesel Island. The people of Petrograd received the news of the occupation calmly. The newspapers publish interviews with some of the Cabinet Ministers and others, who agree that, while the operation seriously affects Russia's strategic position, it does not constitute an immediate menace to the Russian capital.

Mr. Kerensky, October 14, sent a telegram to the commander-in-chief of the northern armies in which he said:

"Tell the redoubtable Baltic fleet that the hour of trial has arrived. Russia expects for her safety a valiant effort by the navy, and I, as generalissimo, demand that the sailors make sacrifices.

"The hour has come when the Baltic fleet can defend the honor of the Fatherland and the great traditions of liberty and of the revolution. It is time to reflect seriously and to cease to cooperate involuntarily with the cause of the enemy. The garrison of Kronstadt has by its attitude already caused the defensive resources of the fortress to be incomplete.

"Let all remember that the Fatherland will not forgive criminal levity. Let the abominable crime of the battleship *Petropavlovsk* be redeemed. Let the fleet repulse the enemy under the command of its officers, whose patriotism is well known to all Russia."

[As the result of a misunderstanding that arose on board the Russian battleship *Petropavlovsk* out of the action of the General Assembly of the Democratic Bodies on calling upon officers of the army and navy in Finland to sign a pledge of fidelity to the Russian provisional government, four officers who refused to sign the pledge were shot at Helsingfors last month by members of the crew. The action of the men on the *Petropavlovsk* later was condemned by the Helsingfors revolutionary committee and all the sailors who participated in the mutiny were arrested.]

Commenting on the German occupation of the Russian island of Oesel, the *Bourse Gazette* says:

"On the whole we must accept as a fact that we have let this whole group of islands fall into the hands of the enemy and that the enemy will be full master of the Finnish Gulf.

"The Cabinet consulted Mr. Kerensky by telephone asking permission to issue a proclamation calling on the Petrograd citizens to forget politics and to unite to serve the endangered capital.

"Mr. Kerensky's illness, which October 13 kept him in bed, was pronounced by his physician to be influenza. The physician says the Premier is in no danger."—*N. Y. Herald*, 15/10.

TWO GERMAN AND ONE RUSSIAN DESTROYER SUNK.—Two German torpedo-boats were sunk, two others were damaged, and one Russian torpedo-boat went to the bottom in an engagement on Sunday, October 14, in Soela Sound, north of Oesel Island, the official statement to-day announces.

The Russian torpedo-craft sunk was the *Grom*, a destroyer of 1100 tons, built in 1914-15, with a speed of 34 knots and a complement of 93 men. More than a dozen German torpedo-boats had forced their way through Soela Sound, supported by a German battleship, when they were met by the Russians and turned back.

The German landing force on the Russian island of Oesel is developing its success, the Russian war office announced, and the Teutons are being reinforced with additional troops.

The Germans have instituted an offensive against the Svorb Peninsula, in the southwestern section of the island, with the object of capturing the Russian batteries at Sarel. These batteries cover the entrance to the Gulf of Riga.—*Washington Post*, 17/10.

RUSSIAN FLEET FEARED TO RISK BATTLE.—The landing of German troops on Oesel Island could have been averted only by risking battle under unfavorable circumstances which might have resulted in the opening of the Gulf of Finland to the enemy, Admiral Verdervski, Minister of Marine, said October 15. The blow is a hard one to Russia, but the Russian fleet apparently was in no position to hinder the Germans.

"Since March," the admiral said, "I have several times drawn attention to the possibility of such a blow, and I also discussed the situation with

Premier Kerensky, but no one paid attention to the government's warning. Although we are at war, our political differences have been given first place in the minds of the people. The Germans take this into account, and events show they have been able to take full advantage of it."

German naval power is four times greater than that of Russia, the admiral continued. The naval force in the Gulf of Riga did everything possible to prevent a landing of the Germans and will continue to carry out all orders of the Minister of Marine.

The Minister of Marine sees no immediate danger of a German attempt to enter the Gulf of Finland. He expresses the belief that owing to the lateness of the season the German operations will be localized.

The Petrograd council of workmen's and soldiers' delegates has issued an appeal to the army and the fleet to obey their commanders and to fight to save the capital and repel the Germans in the Gulf of Riga.—*Washington Post*, 17/10.

GERMANS REINFORCE BALTIC FLEET.—The *National Tidende's* Malmo (Sweden) correspondent in a dispatch says:

"Between Monday and Tuesday, October 15 and 16, a great number of German warships were seen, including submarines and destroyers. It is believed here that the Germans are reinforcing their Baltic fleet."—*N. Y. Herald*, 18/10.

RUSSIAN BATTLESHIP SUNK.—One Russian battleship, the *Slava*, has been sunk in a naval engagement in which, for a considerable time, Russian warships stood off Germany's strong fleet at the entrance to the Gulf of Riga, an official statement announced to-day.—*Baltimore Sun*, 18/10.

MEDITERRANEAN

ALLIED MEN-OF-WAR BOMBARD COAST OF ASIA MINOR.—Allied warships on August 8 bombarded Turkish batteries on the coast of Asia Minor opposite Chios. They silenced one of the batteries and destroyed an enemy aerodrome.—*The Army and Navy Gazette*, 8/9.

GERMAN SUBMARINE SUNK; VICTORS AWARDED.—For sinking a submarine in the Mediterranean on June 12, sailors of the steamer *Meadford* will each get a share in a $500 prize awarded by the Department of Naval Service. The *Meadford* was commanded by Captain C. Dusting.—*Shipping*, 6/10.

TWO U-BOATS SUNK.—French warships destroyed two Teuton submarines in the western Mediterranean in the last week of September, according to information received October 16 by the French Ministry of Marine.—*Washington Post*, 17/10.

U. S. PATROL SHIP FIRES ON ITALIAN SUBMARINE THROUGH MISUNDERSTANDING.—Vice Admiral Sims cabled the Navy Department October 8 that an American patrol vessel, on duty at night in the war zone, had fired on an Italian submarine which failed to answer recognition signals, killing one officer and one enlisted man.

Secretary Daniels at once sent a message to the Italian Minister of Marine, expressing the deepest regret over the unfortunate occurrence, and tendering his and the American Navy's sympathy for the loss of life.

The Navy Department issued this statement:

"The Navy Department has been informed by Vice Admiral Sims, that recently an American patrol vessel while on patrol duty at night encountered an Italian submarine and that when the latter failed to answer the established recognition signals the patrol vessel opened fire, which resulted in the killing of one officer and one enlisted man before the identity of the submarine was established.

"Vice Admiral Sims is thoroughly investigating the unfortunate occurrence and reports will be forwarded later to the department.

"The Secretary of the Navy, upon receipt of the first news, dispatched the following message to the Italian Minister of Marine:

"'I have learned with deepest regret of the unfortunate occurrence which resulted in an American patrol vessel firing, through a misunderstanding, upon an Italian submarine, causing the death of one officer and one enlisted man on the latter.

"'As our patrol vessels are in European waters primarily for the purpose of cooperating with the Italian and other allied vessels in our common cause, the unfortunate encounter is all the more regrettable. Due to the recent unusual activity of enemy submarines in this region, which have resulted in the loss of several vessels, the patrol had been strictly maintained and the unfortunate fact that the patrol vessel did not obtain the recognition signals resulted in her opening fire. Please accept on behalf of myself and the American Navy sincere and heartfelt sympathy for the loss of life which has resulted.

"'JOSEPHUS DANIELS.'"
—*Washington Post*, 9/10.

AMERICAN SHIPS IN MEDITERRANEAN.—In the copy of Secretary Daniels' cablegram made available for the press a long line of asterisks, to mark a deletion from the actual text, follow the words "unfortunate encounter." These fill a gap occupied in the original by the location of the said occurrence Within the last week reports have been prevalent that the unwonted activities of German submarines in the Mediterranean led to the dispatch of American warships there to help deal with the situation.—*Washington Post*, 9/10.

ADRIATIC

NAVAL AND AIR ENGAGEMENT.—Details of the Italian cruiser *Aquila's* fight in the Adriatic with Austrian airplanes, destroyers and cruisers, reaching the United States from Rome, add to the cable account a thrilling story of how the gallant Italian ship, while fighting a fire in her own hold, drove off the destroyers, was bombed by hydro-airplanes, and single-handed engaged three Austrian cruisers until help came up and then safely got to port under her own steam.

The Italian naval commanders having learned that a number of Austrian ships were moving along the eastern shore of the Adriatic, ordered a squadron of Italian destroyers to attack them. The squadron was preceded by the light cruiser *Aquila*. The vessel sighted two Austrian destroyers of the *Tatra* type headed toward Cattaro, the Austrian naval base. The *Aquila* put on full speed and attacked the destroyers, seriously damaging both of them, shooting off their funnels and making several hits in their hulls. Just as it appeared that the Austrian vessels would be obliged to succumb, a fire broke out on board the *Aquila* which compelled that vessel to suspend the engagement while efforts were being made to subdue the flames.

In the meantime the two Austrian destroyers succeeded in escaping, finding refuge in the port of Durazzo, and a large number of Austrian hydro-airplanes was seen advancing. They soon surrounded the *Aquila* and began to drop bombs on her, causing some damage and killing some of the crew. The Italian crew had succeeded in extinguishing the fire aboard the *Aquila*, and attacked the aircraft vigorously, forcing them to withdraw. The hydro-airplanes, however, disappeared only to give place to three big Austrian cruisers, the *Ayda*, *Navara* and *Asparn*.

Without hesitation the commander of the *Aquila* engaged all three ships, meanwhile by wireless calling to his assistance some Italian destroyers cruising in the direction of Durazzo. Very soon the destroyers came up, supported by some English craft of the same type, and the three Austrian cruisers withdrew precipitately, one of them, the *Navara*, severely damaged

and with part of her hull destroyed and with her imperial flag shot away, her first commander seriously wounded and the second commander killed.

In this condition she finally found shelter under the protection of the Austrian coastal batteries and the *Aquila* returned to port under her own steam.—*N. Y. Times*, 7/10.

AUSTRIAN DESTROYER CAPTURED.—The Italian Navy Department has announced the capture of an Austrian destroyer in the Adriatic, according to semi-official advices from Rome, October 11. The Austrian ship surrendered without firing a shot.

The Italian newspaper *Idea Nazionale* says this episode recalls the conduct of the crew of the Italian destroyer *Turbine*, which, having been surrounded by enemy destroyers, fought to the last shot and then was sunk by its own men rather than surrender. The newspaper contrasted the two incidents and declared they illustrated the difference in the morale of the Austrian and the Italian navies.

The military court at Rome has convicted three men of high treason for having attempted to blow up the military and naval defences of the harbor of Genoa and for having actually destroyed the dynamite factory at Cencio. A dispatch from the Italian capital dated October 10 said that the three criminals were sentenced to be shot, and two other persons, who were cognizant of the plots but failed to notify the authorities, thus becoming accomplices under the Italian law, were sentenced to imprisonment for life.—*N. Y. Times*, 12/10.

ITALIAN AIR RAIDS.—The Italian Government is preparing to lay before the Allied Conference, soon to assemble in Paris, a comprehensive scheme for a great campaign against Laibach, regarded as the key to Austrian communications with Croatia and Serbia.

If the Allies approve and are willing to lend the necessary support in supply of coal, steel, munitions and guns, the Italian Government will provide the troops.

Giant Caproni aeroplanes rained bombs October 8 upon the Austrian naval base at Cattaro, starting fires among the buildings in the navy yard and causing damage to Austrian ships in the harbor. The Austrians met the attack with the greatest vigor, but were unable to drive off the aeroplanes until nearly daylight, when the Italians withdrew, without loss, to their own base.

Advices here from Rome indicate that the Italian attack was intended to forestall an Austrian naval demonstration being organized at Cattaro and Pola. The squadron started from its base, 230 kilometers across the Adriatic Sea. Gabriele d'Annunzio, the Italian poet, who has attained distinction as one of the most daring aviators in the war, was in command of one of the aeroplanes.

The squadron arrived at midnight over Cattaro, flying at 12,000 feet. The aeroplanes descended until they were only a few hundred feet over the harbor and began to drop bombs on the Austrian destroyers and submarines in the bay, many of which were seen to be hit, as fires were observed to break out immediately.

Meanwhile other Italian aeroplanes were bombing the naval depots and storehouses ashore and several fires were observed. Several of the Italian aeroplanes were riddled in their wings with shrapnel and machine gun bullets, but were not seriously damaged.—*N. Y. Herald*, 10/10.

BLACK SEA AND TURKISH WATERS

RUSSIAN FLEET OPERATIONS.—On the Black Sea coast on August 26 the Russian troops, cooperating with the fleet, made a raid on the town of Ordu. The landing party, which was met by fire from the houses occupied

as hospitals, destroyed many official buildings and blew up 11 motor boats and seven feluccas.—*The Army and Navy Gazette,* 8/9.

RUSSIAN SUBMARINES RAID THE BOSPORUS.—Russian submarines made their way into the Bosporus, seized the Turkish steamer *Sultan,* loaded with corn, and have taken it to Sebastopol, the official communication issued October 9 announces. In the Black Sea, in the region of the Bosporus, torpedo-boats destroyed seven barges loaded with coal and made 21 prisoners.

Russian submarines have brought into Sabastopol the Turkish steamship *Sultan,* loaded with grain, which was captured in the Bosporus.—*N. Y. Herald,* 10/10.

U. S. ARMY

RANK OF GENERAL RE-ESTABLISHED.—President Wilson October 8 signed commissions as generals for Major General Tasker H. Bliss, Army Chief of Staff, and Major General John J. Pershing, commanding the American forces in France. Though both officers have equal rank, General Bliss takes precedence by virtue of his position as the directing head of the entire army organization. Congress revived the rank of general for the period of the war largely in order to avoid embarrassment to General Pershing in dealing with officers of higher rank commanding the allied armies on the western front. The new grade carries a salary of $10,000 a year, an increase of $2,000 over the pay of major general.

The grade of lieutenant general also was revived by Congress, the rank to be given to commanders of army corps, but it was stated authoritatively at the War Department to-day that there is no intention of creating any lieutenant generals or army corps in the United States at this time, as the divisional training system will be continued. An army corps under the new army organization based on developments of trench warfare is composed of three or more divisions.—*N. Y. Herald,* 9/10.

NEW ARMY ORGANIZATION.—The following statement completely outlines the new army organization for overseas service:

At maximum strength an infantry regiment will comprise 103 officers and 3652 men. It will be made up as follows:

	Officers and men
1 headquarters and headquarters company	303
3 battalions of 4 rifle companies each	3,078
1 supply company	140
1 machine-gun company	178
1 medical detachment	56
	3,755

Each rifle company has a strength of 250 men and 6 officers. It is composed of a company headquarters (2 officers and 18 men) and four platoons. Each platoon includes:

	Officers and men
1 headquarters	2
1 section bombers and rifle grenadiers	22
2 sections riflemen, 12 each	24
1 section auto riflemen (4 guns)	11
	59

The machine-gun company has 6 officers and 172 men. It consists of the headquarters (3 officers and 21 men), 3 platoons (each with 1 officer and 46 men) and a train (13 men). Its armament is 12 machine guns of heavy type and 4 spare guns.

The transportation equipment of the regiment is:

22 combat wagons.
16 rolling kitchens.
22 baggage and ration wagons.
16 ration carts.
15 water carts.
3 medical carts.
24 machine-gun carts.
59 riding horses.
8 riding mules.
332 draft mules.
2 motorcycles with side cars.
1 motor car.
42 bicycles.

New fighting equipment for each regiment, in addition to the usual rifles, bayonets, pistols, etc., includes 480 trench knives (40 to each company), 192 automatic rifles (16 to each company), and three 1-pounder cannon manned by the 1-pounder cannon platoon of the regimental headquarters company.

Each regimental headquarters company is made up of 7 officers and 294 men, as follows:

One headquarters platoon (93 officers and men) including 1 staff section (36 officers and men), 1 orderlies section (29 men), 1 band section (28 men).

One signal platoon (77 officers and men) including 1 telephone section (51 men), 1 section with headquarters (10 men), 1 section with 3 battalions (16 officers and men).

One sappers' and bombers' platoon (43 officers and men) including 1 section sappers (9 men) for digging and special work, 1 section bombers (34 officers and men).

One pioneer platoon (55 officers and men) for engineer work.

One 1-pounder cannon platoon (33 officers and men).

To put into effect this new organization for overseas service considerable rearrangement of units formed on the old plan is, of course, necessary. As soon as possible a statement will be made outlining the new organization of units in the national guard.

The organization of infantry divisions, made public by the Committee on Public Information on August 7, has since that date undergone important changes. The following summary of the organization of an infantry division completes the general outline of organization of the United States Army for service in Europe. The figures are the total of officers and men for each entry. Each infantry division comprises:

1 division headquarters	164
1 machine-gun battalion of 4 companies	768
1 Field artillery brigade composed of 3 field-artillery regiments and machine-gun battalion of 3 companies	16,420
1 field artillery brigade composed of 3 field artillery regiments and 1 trench mortar battery	5,068
1 field signal battalion	262
1 regiment of engineers	1,666
1 train headquarters and military police	337
1 ammunition train	962
1 supply train	472
1 engineer train	84
1 sanitary train composed of 4 field-hospitals companies and 4 ambulance companies	949
	27,152

The new organization increases the ratio of artillery and machine-gun strength to infantry. In place of the old division of three brigades with three infantry regiments in each are two brigades with two infantry regiments in each. But in the new, as in the old organization, there are three regiments of field artillery in each division, making the ratio of artillery to infantry regiments three to four, in place of three to nine. A trench-mortar battery, added to the artillery brigade, and a 1-pounder platoon, attached to each infantry regiment headquarters company, adds to the gun strength of the division.

A division now includes a total of 14 machine-gun companies. Each of the four infantry regiments has one; each of the two brigades has a machine-gun battalion of three companies; and the division has a machine-gun battalion of four companies. This gives each division a mobile machine-gun strength of 10 companies, which can be used as special needs require, while each regiment still has its own machine-gun equipment in one of its component companies. And, in addition, there are 48 sections of auto-riflemen, each section carrying four light machine guns (automatic rifles), one section in each of the four platoons making up each rifle company.—*Army and Navy Register*, 29/9.

NEW ARMY INADEQUATE.—A large deficiency of men will be shown when the first increment of the national army—687,000 men—has been mobilized, is the belief now.

Seventeen national guard divisions must be brought up to war strength and several special service forces organized out of this reservoir, so the number of drafted men remaining at the cantonments will be hardly sufficient to organize the 16 national army divisions on a full-strength basis. Whether incomplete divisions will be formed or a call for more men issued has not been indicated.

Secretary Baker said that definite figures as to the number of national army men it would be necessary to transfer to the national guard were not available. A dual process of organization at the guard encampments serves to delay complete reports. Not only are these divisions being mobilized for the first time, but in the midst of that mobilization the whole fabric of the infantry army in being reorganized on the new trench-warfare plan.

The fighting strength of the new division is now fixed at 27,500 men. The 17 guard divisions on that basis will have a total strength of 437,500 men.

The guard probably brought into the federal service a total of not more than 300,000 men, probably less. It will take, therefore, at least 137,000 national army men to fill up the guard divisions. Another 100,000 of the national army will go to the air service and certainly as many more to other special services. That would leave not more than 250,000 men to form the 16 national army divisions which should have an aggregate war strength of 443,000.

Secretary Baker pointed out some of the difficulties that attend the reorganization of the national guard for war purposes. With the adoption of the European regimental and company standard, every guard regiment had to be expanded. Regiments and parts of regiments are being consolidated to furnish the 3600-men regimental units now desired.

In making these consolidations, the department is attempting to keep the forces as much localized as possible. The same practice will be followed in assigning men from the national army to national guard units. The guard consolidation has brought upon the department a new source of trouble. Numerous colonels and regimental staffs of the guard are certain to be left without commands, since the number of regiments has been reduced.

This has already proven a fruitful source of protest from state officials. The policy of the department, it is said, will be to find places for such guard officers in other forces as far as possible and desirable.—*Washington Post*, 27/9.

TO USE GAS AND FLAME.—American troops in France are to be supplied fully with trained forces to deliver gas and liquid-fire attacks, according to army general orders made public yesterday, giving the organization of special engineer units to handle these devices of modern trench warfare.

The orders show that each army, three corps under the new organization, will have a special engineer regiment of one colonel, one lieutenant colonel and three captains and 38 enlisted men in the headquarters division, and six companies with six officers and 450 men each whose business it will be to handle the "gas and flame service."

In addition each army will have thousands of men in supplemental engineer units to deal with other phases of modern fighting. There will be a mining-device regiment of six special mining companies; a water supply service regiment of six companies; a general construction service regiment, an engineer supply service detachment of three companies, three workshop companies and one service battalion; a battalion of topographical engineers to provide a surveying and printing service; a road-service detachment with three road-engineer companies and six service battalions of four companies each, 10 motor-truck companies of 31 trucks each and five wagon companies with 61 wagons each.

On the line of communication of each army will be a pontoon park with six construction battalions and six service battalions of engineer troops, two supply battalions, two workshop battalions and three supply-service battalions, 10 battalions of forestry engineers supplemented by nine service battalions for this work, two battalions of special quarry-service troops with three supplemental work battalions, five battalions of railway engineers for light railway service supplemented by three work battalions, four battalions of railway engineers for the operation and mechanical department, supplemented by three service battalions.

A standard-gauge railway service is to be maintained by five regiments of special railway engineers (in the first army by the Eleventh, Fifteenth, Sixteenth, Seventeenth and Eighteenth national army engineers) with eight supplemental work battalions. For line of communications work there will be a separate standard-gauge railway contingent of six battalions of railway engineer troops for operations, with three service battalions and one regiment (Nineteenth national army engineers), and one supplemental engineer battalion and one service battalion in the mechanical and supply department.

The order provides also the medical-service officers and men to be attached to each of the new engineer units authorized, and stipulates that the railway-operating and shop troops, forestry troops and service battalions are to be equipped and trained as infantry, but that only 10 per cent of them are to be armed except during their training period.—*Washington Post*, 21/9.

IMPORTANCE OF RIFLE TRAINING.—General Pershing has sent an important message to the War Department as a result of his observations in France, confirming his opinion of the importance that infantry soldiers should be excellent shots. He points out the necessity of thorough instruction and range practice as prescribed in the small-arms firing manual. He remarks that our Allies now fully realize their deficiency in rifle training. It is difficult to secure areas for target ranges in France even when there are no crops, as is now the case, and it will be much more difficult when plowing begins. Then, too, it would take much time to construct ranges and improvise target material. It is preferred that in the theater of active operations this time should be utilized for intensive training with new weapons and formations. General Pershing has strongly renewed his previous recommendation that all troops be given a complete course of rifle practice before leaving the United States, pointing out that the specialty of trench warfare instruction at home should not be allowed to interfere with rifle practice. This has led the Secretary of War to send out instructions to the com-

manding generals of all national army and national guard divisions that target practice should be completed as far as practicable in the United States before troops embark and that special emphasis should be placed on rapid fire.—*Army and Navy Register,* 13/10.

MORE THAN 400,000 OF NATIONAL ARMY NOW IN TRAINING.—The number of men of America's new national army either actually in training or ordered to the 16 cantonments throughout the country totals 431,180. In making public these figures Secretary Baker said that the shipments of clothing to the camps is keeping pace with the arrival of the new troops. Up to October 2, the day before the second increment of draft men was ordered out, nearly thirteen million articles of wearing apparel and sleeping equipment had been sent to the cantonment, and shipments are being made daily.

Camp Funston, in Kansas, has the greatest quota of men of any of the camps, its number being 39,533. Camp Lewis, in Washington state, is second, with 39,171; and Camp Devens, Massachusetts, third, with 33,090. Camp Fuster, Michigan, has the smallest number, 16,193.

The number of men at or ordered to the other camps follows: Camp Dix, New Jersey, 19,363; Camp Dodge, Iowa, 20,324; Camp Gordon, Georgia, 22,507; Camp Grant, Illinois, 25,502; Camp Jackson, South Carolina, 24,975; Camp Lee, Virginia, 27,061; Camp Meade, Maryland, 20,300; Camp Pike, Arkansas, 24,639; Camp Taylor, Kentucky, 27,462; Camp Travis, Texas, 29,249; Camp Sherman, Ohio, 32,886, and Camp Upton, New York, 29,555.

Articles sent to cantonments for the new men include 1,402,390 blankets, 422,346 bed sacks, 436,749 cotton breeches, 259,805 wollen breeches, 267,579 cotton coats, 204,728 woollen coats, 289,713 overcoats, 4,002,856 pieces of underclothing and 937,734 pairs of shoes.

All this material was manufactured in this country, and the quartermaster corps of the army announces that deliveries have been made that seemed impossible a few weeks ago. The industries have been mobilized for the big task of supplying the regular and national armies and the national guard.—*N. Y. Herald,* 12/10.

NEW SPECIAL TROOPS FOR THE ARMY.—The national army will have some 16 or more organizations that have not, for the most part, existed in the regular establishment. These will form a part of the quartermaster corps, and, so far as authorized, are as follows:

Auxiliary remount depot, 33 units, with a personnel of 132 officers and 9834 enlisted men (1 major, 1 captain, 1 first and 1 second lieutenant; 298 enlisted men in each unit).

Animal embarkation depot, one unit, with a personnel of 1 major, 1 captain, 1 first and 1 second lieutenant; 261 enlisted men.

Field remount depot, one unit, with a personnel of 1 major, 1 captain, 1 first and 1 second lieutenant; 261 enlisted men.

Stevedore regiment, four units, with a personnel of 254 officers and 9756 enlisted men (1 colonel, 1 lieutenant colonel, 3 majors, 33 captains, 24 first and 12 second lieutenants; 39 white and 200 colored enlisted men in each unit).

First truck and hose company, 16 units, with a personnel of 16 officers and 400 enlisted men (1 first lieutenant and 25 enlisted men for each unit).

Quartermaster mechanical repair shops, six units, with a personnel of 324 officers and 6978 enlisted men (1 major, 5 captains, 24 first and 24 second lieutenants and 1163 enlisted men in each unit).

Port of embarkation guard and fire company, one unit, with a personnel of 1 captain, 5 first and 5 second lieutenants, and 145 enlisted men.

Graves resignation service, four units, with a personnel of 8 officers and 200 enlisted men (1 captain, and 1 second lieutenant and 50 enlisted men in each unit).

Motor shop truck company, 32 units, with a personnel of 32 officers and 2432 enlisted men (1 lieutenant and 76 enlisted men for each unit).

Quartermaster motor supply train, six units, with a personnel of 48 officers and 2784 enlisted men (1 major and 7 lieutenants and 464 enlisted men for each unit).

Supply company, eight units, with a personnel of 8 officers and 2400 enlisted men (1 captain, 1 first and 1 second lieutenant and 250 enlisted men for each unit).

Bakery company, 40 units, with a personnel of 80 officers and 4040 enlisted men (1 first and 1 second lieutenant and 101 enlisted men for each unit).

Motorcycle company, three units, with a personnel of 6 officers and 111 enlisted men (1 first and 1 second lieutenant and 37 enlisted men for each unit).

Labor company, 24 units, with a personnel of 96 officers and 4800 enlisted men (1 captain, 2 first and 1 second lieutenant and 200 colored enlisted men).

Ice plant company, one unit, with a personnel of 15 officers and 335 enlisted men.

Machine shop truck company, 100 units, with a personnel of 100 officers and 2500 enlisted men.—*Army and Navy Register*, 13/10.

CAMOUFLEURS TO BE RECRUITED.—Recruiting camoufleurs for the national army has been authorized by the War Department, according to a statement made by Mayor Mitchel's committee on national defence. The first of these troops will be enlisted in New York. Their work will be the concealment of artillery, aerodromes, storehouses and other army structures. While many skilled workers, such as scene painters, carpenters, scene builders, masons and decorators are wanted, the majority of the men composing these commands will be unskilled "handy men."

Draftsmen, lithographers, photographers and surveyors also are wanted for the commands of map makers being recruited in New York.—*Washington Post*, 2/10.

ARMY OF 2,300,000.—An American army of 2,300,000 men is to be mobilized and trained for participation in the present struggle to insure the rights of this country to sail the seas without dictation from Germany or any other power and to aid in making the world safe for democracy.

If there has ever been any doubt as to how many troops the United States intended to employ in its fight against Prussian militarism, that doubt was removed when Secretary of War Baker announced to the Senate Committee on Appropriations that he wanted funds to equip and train an army of 2,300,000. Mr. Baker submitted estimates for $287,416,000 in addition to the $7,172,000,000 urgent deficiency bill passed by the House.

"The submission of all these estimates is made necessary in order to provide increased facilities for the manufacture, issue and storage of ordnance material," said Secretary Baker. "They are needed for the equipment of an additional 500,000 men, in anticipation of a call for that number; for procuring additional rifles and an additional supply of small-arms ammunition for machine-gun, rifle and pistol target practice of an army of 2,300,000; for construction work with which the engineer corps is charged in France, and for equipment of special troops operating in the theater of war in Europe."

The chief items submitted included: Ordnance department, for storage, office equipment, etc., $10,000,000; ordnance stores and supplies, $40,000,000; ammunition, $33,750,000; small-arms target practice, $76,676,000; manufacture of arms, $32,690,000; engineer operations in the field, $86,000,000; engineer equipment, $7,800,000.—*Washington Post*, 2/9.

FIVE RIFLES FOR EVERY SOLDIER NOW IN FRANCE.—Every American soldier in France now has five rifles available.

The fact that the American troops must depend upon ammunition sent from this side of the Atlantic, exposed to the submarine peril, has been taken into consideration, and such stores of ammunition have been and will be continued to be supplied that the question of a shortage is negligible.

An abundant supply of "Krags" is available for the training of the troops in cantonments, and when they are ready to go to France, the regular service rifles will be available for them.

That is the way Newton D. Baker, Secretary of War, summed up the situation regarding the controversy over the army rifle question.

It was admitted that all the recruits in the training camps will not have guns immediately. There will be, however, five thousand rifles for each division for training and target-practice purposes. They are of the Krag-Jorgensen type, which the War Department had on hand or had distributed to the militia.

The production of rifles now beginning will increase gradually until they will be turned out so rapidly that there will be no shortage for actual fighting when the time for it arrives.

As a result of the preparations made by the Ordnance Bureau of the War Department the rifles and machine-guns with which the American forces will be equipped will be fitted for the use of American ammuntion. The Lee-Enfield rifle now being manufactured for the United States by the plants in this country, which were at work on British contracts, will use the same ammunition as the regulation army Springfield rifle. The Lewis machine-guns also have been altered in the same way.

In hitting power the American ammunition will be the most powerful used on the French front, and by the rechambering of the Enfield rifles and the alteration of the Lewis gun, it can be used uniformly for all American weapons.

It is admitted at the War Department that the United States was ill-prepared at the declaration of war in the matter of rifle manufacture. The chief of ordnance of the army, Brigadier General William E. Crozier, had repeatedly asked Congress to make provision for the production of small arms, but Congress as often refused to make the necessary appropriation. As a result an enormous burden has been put upon the munitions manufacturers of the country and delays have been encountered in manufacturing the necessary patterns and fixtures which enter into the process of rifle making. Notwithstanding the difficulties an adequate supply of rifles will be ready for the American forces when they go to France.—*N. Y. Herald*, 2/10.

APPROVES NEW GUNNERY SITE.—Secretary Baker has approved the Gunpowder Neck-Bush River, Harford County (Md.), site for the new army ordnance proving ground as a substitute for the Kent Island (Md.) site rejected by Congress.

Under the law a presidential proclamation declaring the military necessity of the new site must be issued.

The War Department then can take possession and seek an agreement on price with property owners. If no agreement is reached, the act authorizes condemnation proceedings to acquire title.—*Army and Navy Register*, 13/10.

OKLAHOMA FILLS ITS QUOTA FOR ARMY.—Oklahoma, on September 28, joined the ranks of the states that have filled their war quota of recruits for the regular army. Oklahoma's quota is 3314. Twenty-eight states now are entitled to be designated as "star" states in the recruiting list. The daily statement issued by Adjutant General McCain follows:

	Obtained Sept. 28	Since Apr. 1		Obtained Sept. 28	Since Apr. 1
Alabama	6	2,475	*Nebraska	14	3,686
Arizona	..	346	*Nevada	..	1,020
Arkansas	3	1,391	New Hampshire	..	675
*California	10	8,161	*New Jersey	15	6,670
*Colorado	4	1,939	New Mexico	..	403
*Connecticut	3	2,619	*New York	54	24,022
*Delaware	3	528	North Carolina	1	1,634
Dist. of Columbia	2	581	North Dakota	3	840
*Florida	8	1,939	*Ohio	34	10,641
*Georgia	8	5,253	*Oklahoma	5	3,314
*Idaho	2	1,146	*Oregon	9	3,198
*Illinois	45	18,340	*Pennsylvania	84	24,825
*Indiana	10	10,207	*Rhode Island	2	1,160
*Iowa	26	5,615	South Carolina	..	1,149
*Kansas	6	4,052	South Dakota	..	1,053
Kentucky	11	4,058	Tennessee	14	3,252
Louisiana	..	2,227	Texas	14	7,524
Maine	..	1,049	*Utah	4	2,003
Maryland	12	2,244	Vermont	2	149
*Massachusetts	18	10,792	Virginia	..	1,619
*Michigan	50	9,625	*Washington	29	3,339
*Minnesota	14	4,324	West Virginia	5	2,190
Mississippi	1	1,139	Wisconsin	12	2,238
*Missouri	18	8,761	*Wyoming	2	726
*Montana	39	2,326			

*Quota obtained.
Total quota, 183,898.
Total obtained September 28, 602.
Total obtained since April 1, 218,547.

—*N. Y. Times*, 30/9.

NEW ARMY TRUCK.—Details of the new standardized motor truck, said by army officials to be superior to any now in use in the world war, given out by the Council of National Defence, show that, as an example of speedy cooperation, the truck rivals the famous Liberty aviation engine, which was designed and constructed within a few weeks.

Forty engineers and hundreds of draftsmen called in from all parts of the country have been quietly engaged in Washington on the designs, work on which was started a little more than a month ago. Early in the week ending October 13 the first completed machine was tested at Lima, Ohio. October 11 another truck was assembled in Rochester and started on the road.

Officials of the Automotive Products Section of the War Industries Board are confident that the new vehicle will prove to be one of the most valuable transportation factors developed for modern war. It was designed for a three-ton load but with a capacity of five tons. Its total dead-weight is slightly less than 10,000 pounds. At present 60 factories are manufacturing and assembling parts, and it is estimated that the government soon will be able to turn the trucks out at the rate of 4000 a month. One firm, it was said, had been equipped to manufacture more of the trucks than all the firms in England could turn out when the war started. The government's first order calls for 10,000 trucks.

The official statement giving the details reads in part:

"The work of speedy cooperation that characterized the production of the Liberty aviation engine has been equaled in the case of the war truck. In spite of the fact that a larger number of interests were involved in the building of the truck, making compromises in design more difficult, the

great unanimity of feeling among those participating makes the result the more remarkable.

"Roughly, there were four major divisions of the engineering work, those relating to the engine, the transmission, the axles, and the other chassis parts. Each was manned by a corps of engineers. There were three, four, and in some cases five, different companies represented in the work on one unit, and it was naturally necessary for the engineers to subordinate all personal considerations to the end of achieving the very best known to the art. Each unit represents a composite of the best features contributed, rather than the work of any one individual. The engineer best qualified to design a certain part handled it in consultation with his fellow-engineers.

"The speed with which the different makers attacked their respective tasks and completed them is shown by the following:

"The Continental Motor Manufacturing Company, which was one of the several engine producers participating in the program, received blue-prints on September 9, and had an engine running 19 days and 18 hours thereafter. The Waukesha Motor Company had its first engine running in 11 days and 7½ hours from the time the blue-prints reached its factory. These companies did not have to make all the patterns for castings or the dies for forgings, some of these having been made previously, but they had to do most of the machining and other operations on the parts.

"In developing the engine four or five makers cooperated by dividing the different parts between them, one making several parts not only for itself, but for the other engine makers. In this way time was saved. The Continental Company made the cylinders, gear-case covers, and many small parts such as pumps, bushings, etc. The Waukesha Company manufactured the cylinder heads, the crank case, intake and exhaust manifolds, roller push rods, etc. The Wisconsin Company made the lower part of the crank case.

The remarkable patriotic response of manufacturers of raw and finished products made possible the completion of the units in record time. As an illustration, the Park Drop Forge Company worked continuously in three shifts and succeeded in sinking the dies for the crankshaft in seven days, an operation which is rarely completed in peace times in less than three weeks. The Werra Aluminum Castings Company produced the pattern for the main crank case and the first casting in five days, this usually taking from three to four weeks on much smaller jobs. The Continental pattern shop completed the pattern for the cylinder pairs in slightly over five days, an accomplishment which can be appreciated only by those who have manufactured engines.

"In summarizing the cooperative talent embodied in the engine, it might be said that the crank case is Continental, the cylinders Waukesha, the oiling system a combination of Wisconsin and Buda, the pistons Hercules, the timing-gear system a combination of Buda, Wisconsin, and Continental. The governor is a combination of Kelly-Springfield and Waukesha. The cam shaft is a composite design. The engine has been designed with the thought of using the heavier fuels, the combustion chamber and other parts having been designed to meet these requirements.

"What has been said of the engine can be said of the transmission, the axles, and other parts. Three or four of the leading axle makers have worked together on the axle designs. So with the transmission.

"So well have all the engineers cooperated that the schedule set for the completion of the different truck units, as well as of the completed truck has been lived up to and generally improved upon. The first engines built in different factories were to have been delivered on September 30 and they were delivered on that date. The completed chassis was to have been ready October 10 and was ready on October 7."

General Baker pointed out that standardization of motor transports in France would save the American Army the necessity of maintaining im-

mense supply stations which the British and French are forced to keep up. The new truck has less than 7500 parts, while the allied forces keep in stock at all times more than 2,000,000 parts for their various kinds of motor vehicles.—*N. Y. Times,* 12/10.

MORE THCN 100,000 OF ARMY OVER SEAS.—Through William Mather Lewis, its Executive Secretary, the National Committee of Patriotic Societies October 16 issued an appeal to loyal citizens everywhere to "demand proof" of doubtful assertions concerning war matters in an effort to trace all injurious statements to their source. The committee's appeal grows out of the fact that there has been widespread circulation of stories for a long time to the effect that American transports have been sunk.

No transports have been sunk, and despite the fact that more than 100,000 American officers and soldiers have now been safely convoyed to France by naval vessels, the official record shows so far that not one soldier has been lost in this work of oversea transportation of a great army.

The false reports being cried throughout the country, to which the National Committee of Patriotic Societies calls attention, are believed by government officials to be for the most part the result of the work of German agents, although, in some instances, they may be set down to malicious mischief. An effort is being made to trace these reports, and it was to aid this that the committee issued its appeal as follows:

"The National Committee of Patriotic Societies, which is now carrying on a campaign to combat seditious propaganda, particularly that which finds circulation through conversation, is getting interesting reports from its local chairmen throughout the country.

"In numerous towns in the Middle West the story is being quietly passed around that several transports filled with troops have been sunk. According to this highly colored tale, a distressed parent who had not heard from his son for several weeks finally appealed to Secretary Daniels and was told: 'Your son and a thousand other soldiers are at the bottom of the ocean.'

"The National Committee showed these reports to Mr. Daniels, who promptly settled the whole matter by saying: 'I could not have made any such statement, because there are no American soldiers at the bottom of the ocean.'

"The National Committee, realizing that these stories are a great detriment to the American cause, are calling upon loyal citizens everywhere to demand proof of doubtful assertions concerning war matters wherever they hear them, and to trace all injurious statements to their source."—*N. Y. Times,* 17/10.

GENERAL

ADMIRAL MAYO RETURNS FROM ENGLAND.—Secretary Daniels authorizes the following statement: Admiral H. T. Mayo, U. S. Navy, and his staff, have returned from England. The purpose of the visit of Admiral Mayo to England was to permit him, in conference with the other officials of the allied navies, to become intimate in every detail with the situation as it is at present, what had been done before, and to discuss the plans for the future. The British Admiralty extended every courtesy and every facility to promote the success of this mission. Admiral Mayo will make a full report to the Secretary of the Navy. Admiral Mayo visited the English fleet and our own forces in British and French waters in order that he might familiarize himself with the conditions under which the allied forces are operating.—*Army and Navy Register,* 13/10.

HOW LATIN AMERICA LINES UP IN THE WAR ON GERMANY.—Countries which have declared war against Germany:

Cuba, April 7.
Panama, April 10.

Countries which have revoked neutrality or severed relations with Germany:

Bolivia—Relations broken April 14, 1917.
Brazil—Relations broken April 10.
Chili—Revoked neutrality June 29.
Costa Rica—Relations broken September 21.
Guatemala—Relations broken April 27.
Hayti—Relations broken June 17.
Honduras—Relations broken May 17.
Nicaragua—Relations broken May 19.
Peru—Relations broken October 6.
Uruguay—Revoked neutrality as regards United States, June 18; relations with Germany broken October 7.

Neutral, but favorable to United States:
Argentina, Ecuador, Paraguay, Salvador.
Neutral—Colombia, Mexico.
Neutral and pro-German—Venezuela.

NAVAL OFFICER'S LETTER.—"You just wait until all our boats gather here and the Pope's peace proclamation will look like a waste of pen and paper," Ensign Charles S. O'Connor, in foreign waters, has written to a friend in this city. The writer proceeds to tell of his "present occupation of keeping the Dutchman below."

"If he sticks his nose up," says the writer, referring to the aforementioned "Dutchman," "he always finds a reception committee of 3-inch guns from the American patrol that is only half established now."

At this point the writer makes his observation about the peace proclamation.

"This crowd over here 'sat up and took notice' when they saw the nerve of the Sammies to cross the ocean in 140-foot boats, and there were more than one in a fleet, too," the letter continued. "Of course, we had a rough time—no sleep and impossible to serve meals—but those little difficulties were easy to put up with.

"You know how we used to argue about the unpreparedness of the navy and what Secretary Daniels should do, etc. Well, 'take it from me,' these American sailors with this spirit would take a rowboat with one shotgun and go out on the English Channel if they saw a U-boat. And as for the people at home talking about being attacked in the states—why, that's a joke.

"We stopped at the Azore Islands to get coal on the way over, and in the harbor of Ponta Delgada the signal was given that a U-boat was outside the breakwater. In a jiffy all lights on the fleet were put out, anchors hauled up, and, one by one, torpedo-boats and all of us went through the harbor in a stormy sea, and Mr. U-boat took to deep water.

"Well, you know the Portuguese are supposed to be some sailors, but they never saw anything like what we showed the natives after only two months of training."

The writer concludes by saying that if America keeps up the progress already made, he believes he will be back on his job in Washington "in just about a year."—*Army and Navy Register*, 27/9.

U-BOATS CONCENTRATING AGAINST AMERICAN SUPPLY SHIPS.—Germany's submarine menace is now being concentrated against American supply ships. A German submarine base probably has been established off the French coast in the American transport lane. There is no real decrease in total allied submarine sinkings. America can only fulfill her gigantic army requirements in France by depending on her own shipping and making the issue with Germany personal.

This is the interpretation of the submarine situation as expressed in an exclusive interview with the United Press by Lord Northcliffe, head

of the British war mission, and the most constructive war critic any belligerent nation has produced.

"The most urgent news that has crossed the Atlantic and reached this country since the beginning of June," Lord Northcliffe said, "is the official statement by Sir Joseph MacLay, the British Controller of Shipping, to the effect that 'unless the United States faces the shipping problem and constructs six millions of tons of shipping annually, the military efforts of the United States will be crippled from the start.'

"This is the solemn warning of Sir Joseph himself. It has passed the censor and is the first note of alarm of the seriousness of the submarine sinkings. Set aside all German boastings; put away from you the idea that Great Britain, who is increasing her own food production, can be starved out.

"The writing on the wall should arouse every thinking American to the greatest problem the world has ever faced—the transport across 3000 miles of water of the new American army, which already amounts to more than 1,000,000 men; its cannon, shells, locomotives, railway track, munition plants, aeroplanes, observation balloons, hospitals, ambulance convoys, doctors, nurses, machine guns, butchers, bakers, shoemakers, men of every trade, railroad engineers, interpreters, organizers and distributors of stores, clothing, horses, mules, fodder, bookkeepers, complete telephone and telegraph equipments with operators running into thousands. Now Sir Joseph MacLay, as British Shipping Controller, plainly says that unless 6,000,000 tons of shipping are built in the United States yearly, you will not be able to transport those vital needs.

"You ask me if I agree with Sir Joseph. I do not profess to have any of the technical knowledge of shipping of the hard-headed Scotsman who was chosen by Premier Lloyd George for a task that is much more difficult than even that of food controller—the control of a shipping that is being sunk more rapidly than it is being constructed, and that, mark you, at a time when the demand for shipping, owing to the transport needs of the United States Army, is increasing daily.

"But I maintain that nothing that has happened alters my conviction that the combined shipyards of the Allies and their combined navies must make a superhuman effort to overcome the losses and growing demand as to Atlantic transport to-day.

"The whole system of publishing the figures of submarine sinkings by the Allies is misleading, and I have protested against it ever since it was adopted. I do not believe that any substantial progress has been made in stopping submarine depredations. Last week we were told officially that the submarine sinkings of British ships were the lightest since the policy of ruthlessness commenced.

"Within a few hours cables flashed the news that the sinkings of French ships over the same period were the heaviest yet reported. In other words, it is probable that part of the submarine force of Germany that is fighting the greatest naval battle of the world off the south coast of Ireland was sent to the French coast to stop the arrival of urgent necessities from America for your daily growing army.

"Remember that the new army that is principally menaced by the policy of operating off the coast of France is the American Army.

The British Army is supplied from Great Britain to an increasing extent with material and munitions across a channel of 20 or 30 miles, adequately guarded. The French and Belgian armies are at home on their own soil.

"The giant supplies for your boys have to travel nearly 3000 miles and across the very track of submarine ruthlessness.

"Of danger to actual transports there is probably little. Not one Canadian soldier has yet been lost at sea out of the the 400,000 that have gone from Canada to France. Submarine attacks on fast ships are rarely successful in these days of zigzagging, camouflage and big guns, but the world's shipping is sinking so fast, and the demands for tonnage,

owing to your need for transportation, are so rapidly increasing that supplies have to be put on any kind of tramp steamer, irrespective of its speed.

"Admit the comparative safety of the convoy system, and admit the bravery and ingenuity of the British and American captains of destroyers; admit the worth of some of Mr. Edison's ingenious devices. There yet remains the serious statement by the greatest authority on shipping in Great Britain that the United States requires 500,000 men to be engaged in shipbuilding; that you must build three times more than the British have ever built in one year, and five or six times what you have previously accomplished in like time.

"I am well aware that progress is being made here and in Great Britain, but are you getting the 6,000,000 tons a year that our Controller of Shipping states to be the minimum necessary to make successful what he truly described as 'your greatest military effort'?

"The problem is almost entirely an American problem. The stoppage of food supplies from this country to Great Britain would be trying, but not fatal. So far as our shipping is concerned, we are not only able to look after all our needs, but we are cheerfully allotting much tonnage to France and Italy. We are glad to do so by reason of our admiration for their work." . . . . —*Washington Post*, 3/10.

THE ANTI-U-BOAT PLANS.—Admiral William S. Benson, chief of operations, in which capacity he is the responsible officer in charge of the navy, has raised the veil of mystery which has shrouded the submarine situation. Military reasons preclude publication of details.

Less than one-half of one per cent of the American ships which have crossed the so-called barred zone since this country entered the war have been attacked successfully. Those which have been destroyed were old, slow vessels. No liner has been sent to the bottom, although they have had repeated brushes with submarines. As a result of the policy being pursued the Navy Department is satisfied it has instilled into German submarine commanders a healthy respect for American gun crews.

Within the last few weeks there have been reports of German submarines off the Atlantic seaboard. One indicated that a submarine was off Nantucket. Investigation shows that a British cruiser was at target practice just before the horizon so that only her superstructure was visible to a merchantman skirting the coast line. The merchantman, seeing the small overhead section of the ship and hearing gunfire, apparently assumed that a submarine was chasing him and immediately wirelessed warning to the shore. In the second case an American ship was off the southern route under similar circumstances and gave rise to a similar alarm.

The Navy Department has no reason for believing that a German submarine has been west of longitude 30 recently. Reports now being spread to the effect that a flotilla is preparing to come to this coast are probably the emanations of agents who desire to confuse the authorities. The situation on the coast is well in hand, and if submarines attempt raids they will be handled without loss of commerce or time by the patrol awaiting them.

The department has reports that submarines may be expected in mid-Atlantic. While discounting these, the navy is prepared also to meet the situation if such a change in German policy is inaugurated. The department has reason for believing Germany is not concentrating her efforts against American troop ships, but is working altogether against supply ships. The fact stands out that Germany would rather destroy oil tankers or other ships carrying supplies than transports with several thousand troops. Just at present supplies are more necessary to the Allies than troops.

Reports that the United States has many remarkable devices for destroying and deceiving submarines have been exaggerated. Edison is working on several inventions which the department hopes may be of value, but so far no successes have been obtained.

The navy has no positive evidence Germany is using super-submarines, but it is believed such boats—some as large as 5000 tons—are in the Admiralty's service. The Germans have increased the size of the guns on the decks of their submarines so that they are formidable in attack without the use of torpedoes.—*Army and Navy Register.*

U-BOAT CAPTAINS MISLEAD BERLIN.—A high naval authority, discussing Admiral von Tirpitz's recent statement, with its grotesque confidence in U-boats, suggested October 3 that his optimism was based on German official figures, which were demonstrably wrong.

Submarine officers misled their superiors in reports, he explained. These probably enter as sunk many vessels which are torpedoed but reach port, and also exaggerated the size of the victims. Even if German officers tried to be accurate, the authority said, errors were inevitable, as submarines must submerge and make a quick getaway for their own safety.

Official German estimates of sinkings of enemy and neutral vessels since the beginning of unrestricted ruthlessness have just been received here. A little under a million tons a month are the totals alleged. As an actual fact the estimates are just 50 per cent too high. This explains the extraordinary continuance of faith among the German people in the efficiency of U-boat warfare.—*N. Y. Times*, 4/10.

DEPRECATES EXTREME VIEWS.—A warning not to take things too much for granted one way or another in the submarine campaign was voiced by high naval officials October 3. The German plan to starve England and France by unrestricted submarine warfare had failed, it was declared, but it was insisted that there was still a real job ahead of this country and the Entente in dealing with the menace.

In every possible way the fight against the U-boat was being pushed, it was insisted, and magnificent results had been accomplished, but this did not mean that the menace had been sufficiently overcome to warrant any let-up in the campaign of the destroyers and the efforts to supply more ships to take the place of lost tonnage.

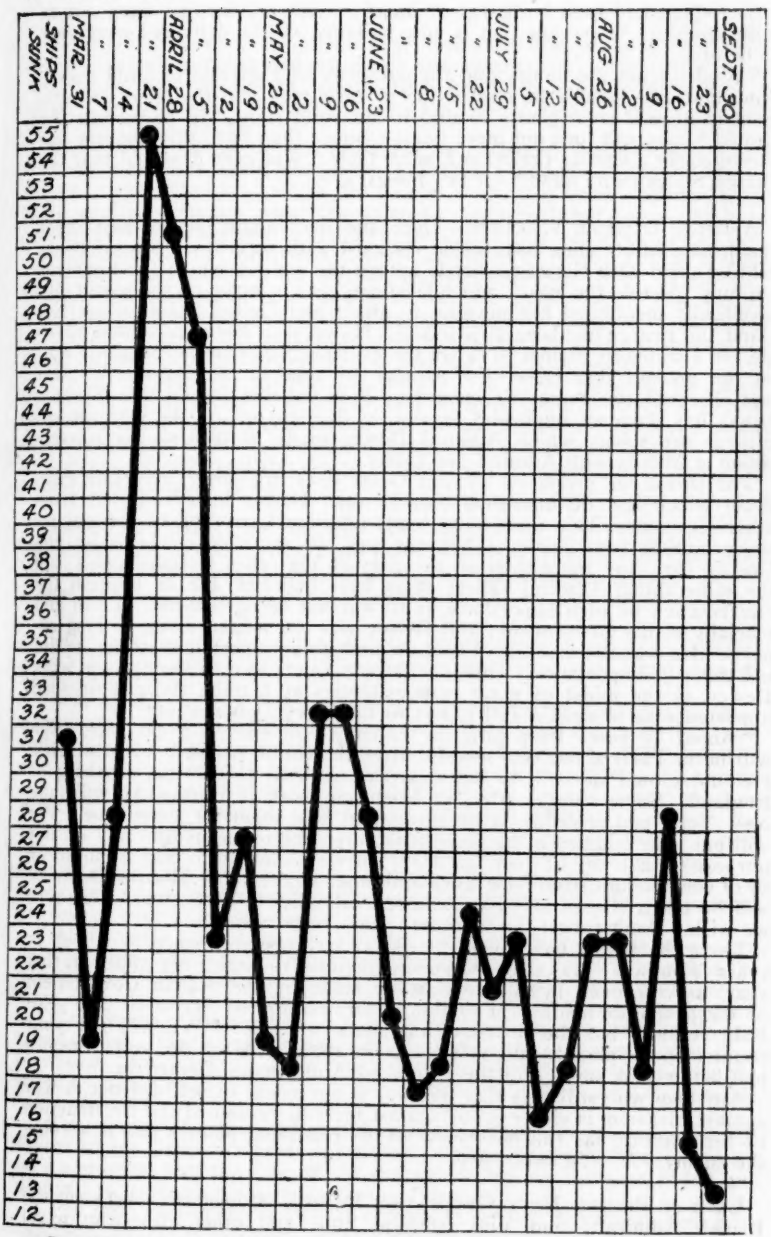
The views of high officials as obtained may be summarized as follows:

"The measures taken to meet the submarine issue are having effect. Last year no ships were convoyed, but now nearly every ship has a convoy. A year ago nearly all the naval authorities of foreign countries as well as of this country said that convoys would not do; that they would simply furnish more targets for the submarines. We have disproved that.

"It will not do, when things go bad, when sinkings increase, to lose our nerve, and say everything is going to pieces. We expect submarine losses to be lessened, but it is wrong to be either too optimistic or too pessimistic. Of course, we are going to win, but neither extreme of feeling is now justified. We will win because we have everything Germany has not, and our advantage will tell in the end.

"Submarine sinkings fluctuate. One week they may be way down, and it might not be accurate to say that measures taken by Germany's enemies are responsible for the decrease. The next week the sinkings may rise sensationally, and it might not be accurate to say that there has been any less efficiency on the part of the patrols. The reason for the fewer sinkings might be that Germany is short of torpedoes, and is holding up the submarines until sufficent torpedoes may be furnished, and when the submarines reappear better equipped they might have greater success, coming out in squadrons.

"The United States is making magnificent headway in the construction of new vessels. Before we entered the war the shortest time in which a



SIX MONTHS OF U-BOAT WAR—A CHART OF RISE AND FALL IN BRITISH LOSSES

(This chart is based on the weekly returns of sinkings issued by the British Admiralty)—*Philadelphia Inquirer*

torpedo-boat had been built was 22 months. We are turning them out in eight months. Every one that is now building will be delivered next year or before.

"We have got the money and the authority of Congress to build everything that can possibly be built with our resources, and the Navy Department itself will erect plants so that it can build ships. In 12 months the United States will turn out more naval tonnage than any other country has ever done in a similar period and more than it was ever dreamed that the United States could build."—*N. Y. Times*, 4/10.

ADMIRAL DEWEY'S WARNING.—Over and over again, in the past three years, men of standing have come forward with reports of conversations held by them with German officials before the war, in which the Germans not only foretold the attack which Germany was to make on the world, but specifically mentioned her purpose to attack the United States when England and France had been disposed of. However, it has always been possible for a stubborn pacifist to reject the evidence, cumulative though it was, on the ground that either the passage of time or the passion of war had obscured the narrator's memory. It is for this reason that Senator Lewis has done an important service in digging out of the government records the report which Admiral Dewey made in 1898 of his conversation at Manila with Admiral von Goetz.

The threat, or prophecy, of von Goetz does not differ in detail from those which less distinguished citizens than Dewey have reported from other Germans. This uniformity lends additional strength to the reports those citizens have made. That this was not mere boastfulness on von Goetz's part, any more than on the part of the other Germans who said the same thing, Admiral Dewey must have believed, for he thought the conversation of such importance as to warrant being reported in full and officially to his government; and Dewey was not a man given to long reports. He was the briefest of writers, and never reported anything he did not think of importance. This is what von Goetz said to him, this is what Dewey, in the midst of great responsibilities at Manila, thought of such importance as to need a full report to the Navy Department:

"About 15 years from now my country will start a great war. She will be in Paris about two months after the commencement of hostilities. Her move on Paris will be but a step to her real object—the crushing of England. Some months after we finish our work in Europe we will take New York, and probably Washington, and hold them for some time. We will put your country in its place with reference to Germany. We do not purpose to take any of your territory, but we do intend to take a billion or so of your dollars from New York and other places. The Monroe Doctrine will be taken charge of by us, and we will dispose of South America as we wish. Don't forget this, about 15 years from now."

There the report has lain in the naval archives ever since. "About 15 years from now" was 1913. Germany intended to launch her attack in that year, as is proved by the revelations made by the Italian Government of the proposals made to it to join in an invasion of Serbia in that year. Italy refused, but the invasion was made in 1914. "We will put your country in its place," said von Goetz in 1898. "After the war America had better look out," said the Kaiser to Ambassador Gerard in 1915.

Any man who still says that this war is not a war of self-defence, a war against invasion, is either proof against facts by reason of the construction of his brain or has full possession of his reasoning powers and is serving the enemy.—*N. Y. Times*, 26/9.

LACK OF BRITISH NAVY COOPERATION DENIED.—Cooperation between the British Admiralty and Vice Admiral Sims and other American naval officers, Secretary Daniels declared, has been complete since the outbreak of the war.

"The spirit shown at the Admiralty," Secretary Daniels said, "has been one of perfect openness and frankness and cooperation. Our officers have had access to every bit of information Admiralty officials have had in relation to submarine warfare. They have opened every door to Admiral Sims and his associates."

Mr. Daniels' statement was prompted by published reports that British inventions for combating submarines had been withheld. On the contrary, he said, every device of which the British Navy had knowledge had been fully explained to the American officers. They included some things of which the American experts had no knowledge at the outbreak of the war. Correspondingly the American experts gave freely to the British all the plans they had evolved for anti-submarine warfare. Both navies had worked out depth bombs as a weapon against submarines. The British had a supply available and these have been used by American destroyers, Mr. Daniels said. The American bomb, however, is an improvement in some respects over the British and is now used by both navies.

Reports of lack of cooperation between the two services, Secretary Daniels thought, arose from an incident early in the war, when a British manufacturer of a patented device wanted by the American Navy asked what was regarded as an exorbitant price. The matter was referred to the Admiralty, he said, and the device is now being furnished at a reasonable rate.—*N. Y. Herald,* 6/10.

OFFENSIVE OPERATIONS AGAINST SUBMARINES.—A high official of the Admiralty said October 4 that more German submarine boats had been sunk during the last three months than during any similar period.—*N. Y. Times,* 5/10.

POLICY OF *Spurlos Versenkt.*—Under the heading, "Policy of *Spurlos Versenkt,*" the *Times'* naval correspondent thus comments on its weekly submarine returns:

"The official return of losses by mine and submarine continues to show a reduction in the total of all classes of vessels, and this total has now fallen below the lowest figures for any week in August. The total then was 18 as compared with 16 now. This is below the average for the month.

"It is always possible such a fall in figures may portend a new development of submarine tactics. Moreover, the large increase of late in the number of vessels posted at Lloyds as missing is a running that it is now necessary to take into account the avowed policy of *spurlos versenkt,* or sinking ships with their crews so as to leave no trace. It is reported that many steamers which have been reported as missing this year represented a value of over $1,250,000 each.

"At the same time it may be assumed the hunt is making progress and defensive measures are proving more effective. Still it is not clear that the virulence of the attack has abated, nor whether the U-boats have altered their methods. The fact that a fleet of merchant ships was attacked off the French coast September 5 by six U-boats lends some support to the latter theory. One of the lessons of this submarine campaign is that slow merchant ships furnish a large proportion of victims, as they have not the speed to escape or even to execute the zigzag tactics by which large vessels baffle pursuers.

"The stream of commerce is well maintained, and so far points to the failure of the German scheme for a short, sharp campaign. Von Kuhlwetter's admission that the date of the decisive stroke has been extended until April 19, 1918, also is confirmation of this.

"The ratio of escapes to attacks appears to support the theory that promiscuous attacks have been exchanged for concentrated efforts against selected ships.

"It is likely we shall never be able entirely to suppress the underwater war on the merchant marine. After all the experiences gained, the mea-

sures taken should be more effective, and although the activities of the U-boats may never be stopped completely, they may, however, be kept within limits."—*Washington Post*, 29/9.

LORD NORTHCLIFFE TELLS OF NEEDS.—Lord Northcliffe, chairman of the British War Commission, on September 29 discussed the industrial problems of the war before the war convention of the United States Chamber of Commerce.

Lord Northcliffe's address in full was as follows:

"I fear that some of you did not hear distinctly the very able, courageous speech that preceded me. You had before you to-night one of the bravest, one of the most patriotic men in the world. When this mighty upheaval began in Europe that man at once abandoned his most prosperous and interesting business career and rushed off to Belgium to organize the food supply for those unfortunate people.

"He was unpopular with the Germans from the start. He may be unpopular with a small section of his own people, but it will be with a very small section, but whether it be a small section or a small community, I know enough of Herbert Hoover to realize that so long as he thinks he is doing his duty for the United States and the Allies he would not care a cent whether he was popular or unpopular.

"I am here to-night to address this vast body of business men for several reasons:

"I am here because I have been a continued eyewitness of the war on its various fronts. In the war behind the battle line and in the most serious part of the war—the home front, the battle with the politicians.

"I am here because I want to tell you some of the many blunders that we made, that you may more speedily achieve what every democracy in the world is striving for—the destruction of the attempt to enforce upon the world a tyranny that would make the world unfit to live in.

"I am here because, for a short time, or a long time, I am certainly conducting one of the largest businesses in this great country. I am administering the spending of between fifty and one hundred million dollars a week on behalf of the British Government and I am here to inform the British Government of all the admirable things I see taking place here. Of all the new inventions and all the specimens of American ingenuity to which I know Europe is looking forward so eagerly.

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"It is most obvious to anybody who gives a moment of consideration to the material and figures involved that war is no longer a question of a few hundred thousand in gay uniform and on prancing horses. It is a matter of whole nations in arms supported by every business effort that can be secured to bring efficient organization, capital and energy to its fullest existence.

"This is a war of engineers and chemists as well as soldiers; of transports, manufacture and distribution: it is essentially a business man's war. We did not realize that fact in Great Britain for many, many months. We were totally unprepared for war. We had an army of 100,000 soldiers, more or less trained, usually less, and a few rounds of ammunition in comparison with Germany's 400,000,000 rounds.

"We entered upon this war, as every nation has entered it, with the idea that war would be short. You had that same notion in 1861, and, as a matter of fact, in the history of wars it is notorious that war is a long thing, and I should be lacking in my confidence for my friend Hoover, who has studied this war from every angle, if I should say otherwise.

"I cannot conceive it to be possible that an organization that has taken since the time of Frederick the Great to perfect is going to be overcome in three years. The Kaiser, the aristocracies and wealthy classes of Germany, are not going to give up their position, their profits, without a struggle to the very bitter end—a struggle that in my opinion would inevitably

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"We have in England one plant that is 9 miles in length and 3 miles in width. You will have to build plants of that size in France. We in Great Britain, although we are only 21 miles from France at the narrowest part of the Channel, have been obliged to erect establishments equal, in my judgment, to the town of Bridgeport, in various parts of France behind the firing line.

"War is too quick a thing to enable you to bring your cannons back and your artillery back to the United States to be repaired, to say nothing of the dangers of the submarine menace. At the speed with which you are raising your army by this time 12 months hence you will probably have from 700,000 to 800,000 men in France. All of them will have to have food, clothes and boots, and in the matter of boots a soldier wears out six to seven pairs in the easiest line of his work and 12 pairs where the work is rough.

"You must realize that you must repair your rifles, for the average life of a rifle in war is six weeks. You must maintain your horses and mules, your hospitals must be fully supplied with what they require in order to take care of your sick and wounded soldiers. Your ambulances must always be in readiness for running to the front. Your trains must always be running between your bases. The soldiers always know where they are, even if you don't know where they are. You have got to maintain at a distance of 3000 miles a whole living community of men and women—for you will need thousands of women for the shops and clerical force in France the same as we do.

"All that has got to be kept up on the other side of the Atlantic and that is a work that requires the brains of men of business. This war is the greatest business the world has ever known and has made demands that have brought every business man to the side of the government, where brains and activities are needed."—*Washington Post*, 21/9.

TO FORCE DISARMAMENT.—America is preparing the army of disarmament, declared Guglielmo Ferrero, the noted Italian historian, in a statement published by the *Secolo*.

"The United States," asserted Signor Ferrero, "are preparing the new American Army to defend their most sacred interests, to prevent Europe from falling under a hegemony which would menace the liberty of the world; and in order to have at the peace conference the necessary authority to summon the great states of Europe to lay down their arms.

"General disarmament after this war will be a necessity if the states of Europe do not wish to rush into barbarism and anarchy. America will rapidly create a vast army because she could not, without very grave danger to herself and to the equilibrium of the whole world, neglect to make a counterpoise in the new continent to the monstrous development of armaments in the old.

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"War such as this is not altogether an evil. It is teaching people to be thrifty—thrifty as to food, thrifty as to labor. It is teaching people to devise new machinery; it has infinitely improved surgery, dentistry, hospitals, sanitation. And while the losses in this war are great, the losses of sickness and other ills cured through medical science brought forward during this war, are greater.

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"Many persons—and among them are some members of the mission sent by the Italian Government to the United States—are of opinion that

the United States would give more help to the Allies by sending food, arms, and money rather than soldiers. It is said that the transport of a large army from America to Europe would require too great a number of ships, and would, therefore, complicate still further the provisioning of the Allies in Europe, who are more in need of food and other necessary things than of men. But those who argue on these lines show that they have not understood the very profound reasons for America's intervention. America will help the Allies with money, food and metals, but also, and very largely, with men, because she needs to-day to create a large army.—*N. Y. Times*, 6/10.

BRITISH ADMIRALTY REPORTS TWELVE CASES OF U-BOAT CRIMES.—The British Admiralty communicated on August 26 to the International Conference of Merchant Seamen a statement of the facts of twelve cases of sinkings in the previous seven months, wherein the U-boat commanders had deliberately opened fire on the crews of the vessels after they had left their vessels, or (as in the case of the *Belgian Prince*) had attempted to dispose of the sailors in some other heinous way—*spurlos versenkt* ("without leaving any trace").

The list of these offences is as follows:

(1) *Kildare*, British steamship. Sunk by submarine April 12, 1917. While boats were pulling clear of ship shells came over them and then a submarine was seen on the surface. She fired from 10 to 15 shells at the boats, killing an A. B.

(2) *John W. Pearn*, British steamship. Sunk by submarine May 1, 1917. Submarine fired two shots at boat which was pulling away.

(3) *Vulcana*, British steamship. Sunk by submarine March 7, 1917. After boat had been got out, she capsized in the heavy swell running, and had to be righted. Firing was continued by the submarine until boat was clear.

(4) *Belgian Prince*, British steamship. Sunk by submarine July 31, 1917. Lifeboats not fired on, but broken up and survivors thrown into sea after being placed on outside of submarine, which submerged, leaving them to their fate, after also depriving them of life belts.

(5) *Westminster*, British steamship. Sunk by submarine December 14, 1916. Survivors took to boats and were shelled by submarine, captain and chief officer being killed.

(6) *Eavestone*, British steamship. Sunk by submarine February 3, 1917. Submarine turned her gun on boats, firing three shrapnel shells and striking both boats. Third shell killed master, steward, donkeyman and two A. B.'s; severely wounded second officer.

(7) *Addah*, British steamship. Sunk by submarine June 15, 1917. Submarine opened fire on master's boat, killing eight men, and after boat had been sunk and all men were swimming in the water, submarine shelled them with shrapnel.

(8) *Umaria*, British steamship. Sunk by submarine May 26, 1917. Submarine fired on boat injuring all occupants.

(9) *Vanland*, Swedish steamship. Attacked by submarine July 23, 1917. As lifeboat was making for shore, submarine continued to fire on master and crew with machine gun, wounding the second mate.

(10) *Baltic*, Swedish steamship. Sunk by submarine June 27, 1917. Boats fired on for about an hour after crew abandoned ship.

(11) *Freden*, Danish steamship. Sunk by submarine May 22, 1917. Lifeboat damaged and several of crew wounded while trying to mend it; one Frenchman killed, other severely wounded.

(12) *Hestia*, Dutch steamship. Sunk by submarine March 30, 1917. One boat fired on by submarine and sunk, six Dutchmen and seven Chinamen being killed.

BRITISH NAVY HONORS AND DECORATIONS.—A list of navy honors and decorations was issued on Thursday, August 30, principally in connection

with minor operations. The Victoria Cross has been awarded to the skipper of the drifter *Gowan Lea,* Joseph Watt, R. N. R., in connection with the action in the Straits of Otranto on May 15; while the captain of H. M. S. *Dartmouth,* Captain Albert Percy Addison, R. N., has been made a C. M. G. in connection with the pursuit of and running fight with Austrian cruisers which had attacked the drifters in the Straits, and "especially for his excellent judgment and work in bringing his ship safely into port, when she had been torpedoed by an enemy submarine on her passage back, after the cruiser action was over." The engineer-commander of the ship, Frank Rheuben Goodwin, gets a D. S. O., for "exceptional work under very trying conditions in bringing H. M. S. *Dartmouth* to port after she was torpedoed." In connection with the same engagement conspicuous gallantry medals have been given to two enginemen of the drifters: Firstly, Engineman Charles Mobbs, R. N. R., who "remained at his post until the main steam pipe was shot away, when he was forced to leave the engine-room, but as soon as possible he returned and put out the fires. He also went in a small boat and assisted to plug holes in the ship's side, thus enabling her to reach port safely." The other engineman is Walter Watt, R. N. R., of whom it is said "the crew were taken prisoners, but on their way to the Austrian cruiser Watt jumped overboard. He was recaptured, and when alongside the cruiser he again jumped overboard and escaped. He was picked up by another drifter 1½ hours later." A number of honors were given in connection with actions with enemy submarines, and these include distinguished service medals to Engine-room Artificer Hugh Robinson, R. N. R., and Chief Engine-room Artificer Robert Arthur Dunlop. Amongst those mentioned in dispatches is Engineer-Lieutenant Neal Shaw McKinnon. The Emperor of Japan has granted decorations of the "Order of the Rising Sun" and of the "Order of the Sacred Treasure" to a number of admirals, captains, etc., of the navy, and the "Order of the Sacred Treasure" of the third class has been given to Engineer-Commanders William J. Duffell, R. N., Walter R. Parnell, R. N., and George R. Byles, R. N.—*Engineering,* 31/8.

GERMAN AIR CHAMPION PRAISES BRITISH FLIERS.—High tribute to the daring displayed by his British enemies is paid by the German champion air fighter, Major Baron von Richthofen, in an interview with Baron Ompeteda, a German novelist, printed in *Die Woche* of Berlin, and summarized in the *London Daily Mail* of September 21.

According to a report sent out from Berlin and printed in the *New York Times* of July 22, Major Richthofen had brought down 62 enemy airplanes up to the first week in July, thus far outstripping the record of the late Captain Boelke, who conquered 40 opponents. Lieutenant von Richthofen, a brother of the German champion, is reported to have brought down 24 machines up to September 1.

According to the description of his private headquarters on the western front, Major von Richthofen concentrates most of his thought and energies upon the British flying corps. The walls of his lair are decorated with trophies from British planes, such as propeller parts, the emblematic red, white, and blue circles cut from wings, remains of machine guns wrecked when his victims crashed to earth, and other tokens of the conqueror's prowess. Richthofen is filled with lively respect for British antagonists.

"I am a great believer," he said, "in taking and retaining the offensive. Airmen must attack. Once we are jockeyed into the defensive, it is devilish difficult to turn the tables. Above all else, we have to outwit the English in this respect. Their airmen are simply daredevilry personified. They hardly ever take time to study the situation, but are always ready, even under most unfavorable conditions, to attack. This often results in their coming woefully to grief, but their intrepidity makes them foes to be respected. Their battle tactics differ conspicuously from the French, who adhere to the more conservative rule of attacking only when in

superior force or when conditions are unusually favorable. It has been my experience that the English are not attacking now with as much vigor as hitherto. I attribute that to the circumstance that their experienced flyers, their best men, have been lost, and the newer and younger airmen have not yet had sufficient practice in actual fighting.

"There is no room for 'soft' methods in air fighting. I often attack at 300 yards, but can, of course, achieve better results at 150. Airmen cannot be governed by regard for anything but victory. Above all, they must not indulge in any sentimentality. That's something entirely unknown in an English antagonist. Indeed, he would laugh at such a thing. To give way to wishy-washy thoughts with an enemy's machine gun blazing away at you at close range can easily cost you your life."

Richthofen is 25 years old, of medium height, and muscular build. He has blue eyes and fair hair, and is described as being so shy that he creates the impression of being able to blush easily. A simple lieutenant of Uhlans in 1912, he has risen in rank with unusual rapidity. Richthofen's battleplane is said to bear many scars inflicted by enemy bullets.—*N. Y. Times*, 14/10.

BRITISH AIR EXPLOITS.—Among recent exploits by British aviators there was one well worth recording which was carried out September 26, a day when several notable encounters occurred. An English airman, after crossing the lines at an altitude of 2000 feet, saw an enemy machine and gave chase, but was driven back by five German albatrosses. He returned toward the lines, and seeing 15 men on a railway descended and scattered them with his machine gun. Near by he dropped a bomb on a munition dump surrounded by soldiers and the dump blew up.

Once more he engaged the same enemy aeroplane he had attacked before, but was driven off again by a large number of German flyers. He dived to escape from them, and in doing so passed into a heavy artillery barrage. A shell went through the mechanism, cutting his elevator controls and one side of his rudder control. He swung toward the ground, but managed to pull his machine out of spin by using his engine at the last minute, and he landed just behind the British barbed wire.

Two soldiers ran to his assistance. As they were helping the dazed aviator away from the machine a German shell burst behind them, killing one of the soldiers and wounding the other. The aviator was trying to assist the wounded man when the airman himself was wounded. Several stretcher carriers then rushed up and were carrying away the wounded men when a big shell exploded beside the aviator's stretcher and dumped everybody in a heap. The aviator did not wait for any more stretchers, but beat a hasty retreat on foot, despite his wound.

On the same day one British aviator dispersed five hundred German troops with his machine gun. On Saturday four British aeroplanes engaged nine German albatross scouts. The Britishers brought down one enemy machine, which crashed to the ground: downed another one in flames and put three completely out of control, besides one apparently out of control.

Innumerable bombing raids have been carried out by both sides in the last few days. The bright moonlight nights have been especially favorable for the work and after dark the air has been filled with machines from both sides, which make their way far back of the lines amid heavy shelling from the anti-aircraft guns.—*N. Y. Herald*, 4/10.

REPRISALS.—French aviators have dropped a half a ton of projectiles on the German city of Stuttgart in reprisal for the bombardment by the Germans of Bar-le-Duc. An official report says:

"The enemy last night, September 30, bombarded the country in the vicinity of Bar-le-Duc, causing material damage and resulting in several victims.

"As a measure of reprisal for the German bombardment of the open town of Bar-le-Duc, two French aviators on the night of September 30-October 1, threw down 300 kilograms of projectiles on the fortified town of Stuttgart."

Stuttgart, capital of the kingdom of Wurttemberg, is a city of nearly 200,000, about 100 miles from the French border.—*Washington Post*, 2/10.

Continuing their reprisals for attacks of German airmen on French cities, French aviators October 2 dropped bombs on the German town of Baden, the War Office announces. The statement follows:

"In reprisal for the bombardment of Bar-le-Duc two of our aviators dropped several bombs on the town of Baden.

"On the night of October 1, and during the day of October 2, our aviators bombarded the railway station at Friobourg, factories at Volkalgen and Hoftenbach, and railway stations at Brisulles, Longuyon, Metz, Woippy. Arnaville, Mezzières-le-Metz, Thionville and Sarrebourg. In the course of these various expeditions projectiles to the amount of 7000 kilograms (15,400 pounds) were dropped."

The town of Baden, in the Grand Duchy of the same name, is one of the most famous and beautiful watering places of Europe, best known for its medicinal baths. It is a town of some 15,000 inhabitants, about 55 miles from the French border.—*N. Y. Herald*, 4/10.

The German cities of Frankfort-on-the-Main, Stuttgart, Treves and Coblenz were bombarded last night by French aviators in retaliation for German aerial attacks on French cities. The following official announcement was given out:

"The Germans last night, October 1, made a new attack on the town of Dunkirk. The bombardment was very violent, causing serious material damage. It is reported there were numerous victims among the civilian population.

"In reprisal for the bombardments carried out by the Germans against Bar-le-Duc and Dunkirk, our aviators last night threw down bombs on the towns of Frankfort-on-the-Main, Coblenz, Treves and Stuttgart.

"Our bombarding airplanes made numerous expeditions, in the course of which 2120 kilograms (4664 pounds) of explosives were thrown on military buildings in Roulers and 6000 kilograms (13,200 pounds) on the railway stations at Metz-sur-Woippy and Thionville, the airdrome at Chambley, encampments at Spincourt and Tilly, and munitions depots at the Longeau farm, where a violent explosion was observed.

"Two German airplanes were brought down yesterday by our pilots and four others were compelled to land in a disabled condition."

Treves, Coblenz and Frankfort all lie in the same general direction from France, and are approximately 65, 120 and 160 miles distant from where the French fighting line is now located. Treves is in Rheinish Prussia, Coblenz is 57 miles farther inland, in Prussia, and Frankfort lies still beyond, in Prussia. All three are very old cities, rich in architectural and historical interest.

Stuttgart is in Wurttemburg, farther to the south, and is about 132 miles from the French front.—*Washington Post*, 3/10.

BERLIN SAYS ALLIES LOST 374 AIRPLANES DURING SEPTEMBER.—On the various German fronts the Entente forces lost 374 aeroplanes in September as against 82 machines lost by the Germans, according to figures given out by the German Army Headquarters October 11. The text of the announcement reads:

"The losses sustained by the enemy aerial forces in September on the German fronts were 22 captive balloons and 374 aeroplanes, including 167 behind our lines. The remainder were brought down beyond enemy positions. In encounters we lost 82 aeroplanes and 5 captive balloons."—*N. Y. Herald*, 12/10.

FLYING OPERATIONS AT NIGHT.—As far as bombing operations are concerned the navy that flies confines its attentions principally to the Prussian bases along the Belgian coast and any lurking submarines or vagrant destroyers observed in the vicinity. Bombing is carried out by both aeroplanes and seaplanes, and differs from other forms of war flying in that it is principally performed at night.

The function of the bombing machines is to reach a given objective in as short a time as possible without provoking more "scraps" on the way than are inevitable, to "deliver the goods" and, if not brought down by anti-aircraft fire, to return with all speed. They are not primarily fighters, and when laden with bombs are not theoretically a match for hostile fighting machines with unfettered maneuvering powers.

Engine trouble over enemy territory means almost inevitable capture or death for the pilot of a bombing aeroplane. Yet in cases of disablement, rather than come down on the ground and suffer themselves or their machine to be taken prisoner, it is their gallant tradition to try and struggle out to sea. Here they stand about as much chance of life as a pheasant winged above a lake, but the machine sinks before enemy hands can touch it.

Now it happened that on one such occasion the descent into the sea of a bombing machine was observed by two French flying boats, which were out on patrol. The distressed machine was still within range of the shore batteries and the Boches, smarting under the effect of the bombs it had succeeded in dropping, were retaliating in the most approved Germanic manner by plastering the helpless machine with shrapnel as she slowly sank.

The two French flying boats sped to the rescue and alighted in the water beside the wrecked British machine. One embarked the observer, who was wounded, and in spite of redoubled fire from the shore succeeded in returning safely. The other French flying boat actually embarked the remaining occupants of the bombing machine, but was hit as it rose from the water and fell, disabled. The French pilot, seeing a Boche seaplane approaching and a bevy of small craft in shore coming out against them, scribbled a message to say that his venture had failed. He found time to add, however, with true gallant dauntlessness of spirit, "*Vive la France!*" This missive he fastened to the leg of his carrier pigeon and succeeded in releasing it before rescuers and rescued were taken prisoner.

From time to time curt official announcements of successful bomb raids upon German destroyers and submarine bases appear in the press. It may be that the naval honors or casualties lists are swelled thereby. But no one who has not stood in the wind that blows across the bombers' aerodrome at night in those last tense moments before the start can form any idea of the conditions under which these grim laurels are earned.

One by one the leather-clad pilots conclude their final survey and climb up into their machines. They adjust goggles and gloves; there is a warning, "Stand clear!" and the darkness fills with roaring sound as No. 1 starts his engine. For a few moments longer he sits in the utter isolation of darkness and the deafening noise of his own engine. No further sounds can reach him—not another order or the valedictory, "Good luck!" from those whose lot it is to only stand and wait.

He settles himself comfortably and fingers the familiar levers and throttle; then with a jerk the bomber starts along the unseen ground, gathers way and, rising, speeds, droning into the darkness like a gigantic cockchafer. A moment later No. 2 follows, then another, and another. The night swallows them, and the sound of their engines dies away.

A couple of hours later in one of the gray-painted huts that fringe the aerodrome a telephone bell jangles. The squadron commander picks up the receiver and holds converse with a tiny metallic voice that sounds very far away; the conversation ends, he puts on his cap and goes out into the darkness. A few minutes later a sudden row of lights across the aerodrome makes bright pin-pricks in the darkness. From far away in the air comes the hum of an engine growing momentarily louder. It

grows louder and clearer as the homing machine circles overhead, and finally comes to earth with a rushing wind and the scramble of men's feet, invisible.

The pilot climbs stiffly out of his seat, pushing up his goggles, and puckers his eyes in the light of the lanterns as he fumbles for his cigarette case. "Got 'em," he says, laconically. "Seaplane sheds on the mole. Time for another trip?"

There is time, it appears. He drinks hot coffee while the armorers snap a fresh supply of bombs into the holders and test the release gear. He answers questions curtly, and his replies are very much to the point.

They've got a lot more searchlights at work than they had last time. Rather warm work while it lasted. He thinks No. 1 was hit and brought down in flames. No. 2 seemed to have engine trouble this side of the lines on the way back. No. 3 ought to be along soon. And while he gulps his coffee and grunts his monosyllables there is a whirring overhead and No. 3 returns, loudly demanding a fresh supply of bombs with which to put an artistic finish to a row of blazing oil tanks.

They climb into their machines again and lean back resting while the finishing touches (which sometimes come between life and death) are put to the machines and their deadly freight. Then once more they soar up into the night.

Dawn is breaking when No. 4 returns, tired eyed and more monosyllabic than ever. It came off all right, but No. 3 had seemed to lose control, slid down the beam of a searchlight with shell and balls of red fire (some new stunt, he supposed) bursting all about her. However, she got her bombs off first and touched up something that sent a flame 200 feet into the air. He himself bombed a group of searchlights that were annoying him and some cars on a railway siding. The speaker has an ugly shrapnel wound in the thigh and observes with grave humor that his boots are full of blood—this is a navy joke, by the way. Also that he could do with a drink.

But it came off all right.

Now the seaplanes that undertake much the same sort of job keep pigs and contemplate their stern mission with an unextinguishable and fathomless sense of humor. This may be accounted for by the fact that in life and death they are more in touch with the native element of the navy-that-floats and share much of its light-heartedness in consequence.

Aerial gymnastics are not in their line. They fight when they must, and the straightest shot wins. If hit, unless hopelessly out of control, they take to the water like wounded ducks. If the damage is beyond temporary repair they sit on the surface and pray for the dawn and a tow from a friendly destroyer.

No aerial adventure is ever recounted (and the array of D. S. C. ribbons round their mess table is witness of the quality of these blindfold flights) without its humorous aspect wellnigh obliterating all else. One who fought a Zeppelin single handed with a Webley Scott pistol and imprecations found himself immortalized only in the pages of a magazine of elephantine humor they publish (fate and funds permitting) monthly. Another, disabled on the water off an enemy's port, succeeded in getting his engine going as the crew of an armed trawler were leaning over the bows with boathooks to secure him. He rose from the water beneath their outstretched hands and recalled with breathless merriment nothing but the astonishment on their Teutonic faces. A third, similarly disabled, was approached on the surface by a U-boat. He raked her deck with his Lewis gun and kept her at bay by the simple expedient of picking off every head that appeared above her conning-tower—until she wearied of the sport and withdrew. From a seaplane point of view it was a pretty jest.

The navy-that-flies is quickly building up its own peculiar and imperishable traditions. Not least of these is the seaplane's invincible gayety of spirit.—*N. Y. Herald*, 23/9.

GERMAN COMMENT.—General Baron von Freytag-Loringhoven, chief of the supplementary general staff of the German Army, has published a pamphlet entitled "The Results of the World War," in which he says:

"The general political and economical situation of the world war works only in favor of our enemies and the German soldiers will be defrauded of the fruits of their victories."

The general thinks that trench warfare was a great mistake and says that only an aggressive attack could have brought successes. He adds, however, that the German offensive was not strong enough to overthrow the Allies.

The *Post*, of Munich, expresses the hope that the reasonableness of the general's utterances will teach the pan-Germans "who would fight to conquer the whole world with their mouths," to estimate corectly the limitations of Germany's military power. The *Post* continues:

"Our world economic position must be changed completely by a new administration of our foreign policy, based on democratic principles. Therefore, we do not require a strong peace against the east and the west which would bring us into opposition with all the great powers, but a far-sighted and lasting peace by agreement."—*Washington Post*, 21/9.

"ON SEA."—The following editorial was published in the *New York Times*, September 23:

"It must have been with a heavy heart that Kaiser Karl, who longs for peace, signed that duplicate of Kaiser Wilhelm's reply to the Pope which is Austria's answer. The two replies differ only in wording; they are identical otherwise, and the identity is of German manufacture, not Austrian. Sift them down and you will find in them, after an unctuous acceptance of the Pope's desire for the substitution of morality for lust in international relations, nothing but an attempt to take advantage of the Pope's note to force the disbandment of the British Navy; and what interest has Austria in that bogus issue of 'the freedom of the seas' that should make her go on fighting when she wants peace?

"The Pope proposed disarmament; Germany smoothly 'shares his Holiness's view' that the nations should agree to cut down their armaments 'on land, on sea and in the air,' and to secure 'the true freedom and community of the high seas'; for the phrase 'the true freedom of the community and high seas' is obviously an error of transmission. This is the only real suggestion for peace that stands out in the welter of pious words. Austria, too, perforce, whatever terms of peace she may long to offer, is constrained to suppress them and talk of her desire that the nations should 'attain complete freedom of movement on the high seas.' This, then, is the issue of the war as Germany pretends to see it and forces Austria to pretend to see it. But that is not the issue; the issue is the false and ruthless character of the German Government, which will not leave the world at peace and cannot be trusted to keep any promise.

"The seacoast of Germany, Austria, Turkey and Bulgaria combined is an infinitesimal fraction of the world's coast line. If they were all obliterated from the map the shrinkage would not be noticeable on any globe or atlas; search would have to be made for it. Yet they are the only countries that are concerned about 'the freedom of the seas.' No other country, enemy or neutral, has ever noticed that its freedom is restricted. Since the world is so well satisfied with the freedom it has on the seas, is the war to continue until this almost undiscoverable fragment of coast line is satisfied about its own freedom? But the truth is that Germany is as free on the seas, in time of peace, as England is. The British Navy, a great weapon in time of war and necessary to the safety of the human race when German aggression threatens it, interferes in time of peace with no nation's free use of the seas. What Germany means by securing 'the freedom of the seas' is shown in her proposal that there be a 'simultaneous and reciprocal' limitation of armaments on land, in the air and 'on sea.' On sea; that is the heart, the core, the nub of that whole assemblage of fine phrases. Let

Britain disband her navy or reduce it, so that when Germany next sets out to conquer the world she will not find that navy in her way.

"If a German republic, or a German monarchy responsible to the people, were to propose disarmament and arbitration as a way out of this war, all the belligerent nations would at once consent, and gladly, to a peace conference that should arrange it. But the reason they are fighting Germany is because her government is not only ruthless but also false and treacherous; because its word is worthless. They will not accept at its hands one more scrap of paper, whether that scrap of paper bears old words, such as 'the neutrality of Belgium,' or new ones, like 'disarmament and arbitration.' Suppose the present German Government should solemnly agree to arbitrate all future quarrels, does any man in his senses suppose that it would do so? Suppose it should agree to disarm, would any other nation disarm because of that promise? Cardinal Gasparri, apparently seeing this difficulty, proposes that after the agreement is negotiated any nation which violates it shall be boycotted. But four-fifths of the world is boycotting Germany now for the violation of its agreements, and not only boycotting her but fighting her. Does that deter her? If it does not deter her now, will it in the future?

"No negotiation can be entered into with the present German Government, because it would not carry out any agreement not to its interest. If the German people will put forward a government that can be trusted, the world will listen to its proposals in no such skeptical spirit as it listens to those put forward to-day. If they will not do so, then the present German Government must be beaten until it makes no difference what terms it will agree to and what terms it will not.

"At present Germany proposes nothing except that the war be ended by a promise on Germany's part to reduce its army reciprocally with other nations, a promise which Germany would not fulfill; a promise that England reduce its navy, a promise which Germany would expect England faithfully to fulfill; and a promise of the nations to arbitrate in future, a promise that Germany would laugh to scorn the moment it suited her. She sees the issue of the war as 'the freedom of the seas,' seas that are as free in times of peace to Germany as they are to England, and this is an issue which does not concern in the least the rest of the world, not even Austria. The rest of the world sees the German Government as the issue. The German Government knows it well, and the whole reply to the Pope, dictated in Berlin and transcribed with forebodings in Vienna, is merely an effort to save Hohenzollernism."—*N. Y. Times*, 23/9.

INDEX OF WAR VESSEL LOSSES MENTIONED IN THIS NUMBER

NOTE.—A complete table of losses since the beginning of the war will be published semi-annually; the latest appears in the July number of the PROCEEDINGS.

UNITED STATES VESSELS

	PAGE
1 auxiliary	2707

BRITISH VESSELS

Drake	2706
1 destroyer	2718

RUSSIAN VESSELS

1 battleship *Slava*	2732
1 destroyer	2728
1 destroyer	2731

GERMAN VESSELS

	PAGE
1 destroyer	2708
1 destroyer	2708
2 destroyers	2731
1 submarine	2724
1 submarine	2724
1 submarine	2724
1 submarine	2724
1 submarine	2724
1 submarine	2732
2 submarines	2732

AUSTRIAN VESSELS

1 destroyer	2734

DIPLOMATIC NOTES

FROM SEPTEMBER 18 TO OCTOBER 18

PREPARED BY

A. F. WESTCOTT, PH. D., Instructor, U. S. Naval Academy

THE TEUTONIC REPLIES TO THE POPE

The complete texts of the German and the Austrian replies to the Pope's peace proposal of August 1 were made public Sptember 21. Beyond a reference to the Reichstag Peace Resolution of July 19, the German note avoided any specific statement of German war aims, but gave support to the views of the Pope in favor of the general principles of "reciprocal limitation of armaments," "true freedm of the high seas," and "obligatory arbitration." The Austrian reply covered the same points in somewhat different language. The texts follow:

Austrian Reply.—Holy Father: With due veneration and deep emotion we take cognizance of the new representations which your Holiness, in fulfillment of the holy office intrusted to you by God, makes to us and the heads of the other belligerent states, with the noble intention of leading the heavily tried nations to a unity that will restore peace to them.

With a thankful heart we receive this fresh gift of fatherly care which you, Holy Father, always bestow on all peoples without distinction, and from the depth of our heart we greet the moving exhortation which your Holiness has addressed to the governments of the belligerent peoples.

During this cruel war we have always looked up to your Holiness as to the highest personage, who, in virtue of his mission, which reaches beyond earthly things, and, thanks to the high conception of his duties laid upon him, stands high above the belligerent peoples, and who, inaccessible to all influence, was able to find a way which may lead to the realization of our own desire for peace, lasting and honorable for all parties.

Since ascending the throne of our ancestors, and fully conscious of the responsibility which we bear before God and men for the fate of the Austro-Hungarian Monarchy, we have never lost sight of the high aim of restoring to our peoples, as speedily as possible, the blessings of peace. Soon after our accession to the throne it was vouchsafed to us, in common with our allies, to undertake a step which had been considered and prepared by our exalted predecessor, Francis Joseph, to pave the way for a lasting and honorable peace.

We gave expression to this desire in a speech from the throne delivered at the opening of the Austrian Reichstag, thereby showing that we are striving after a peace that shall free the future life of the nation from rancor and a thirst for revenge, and that shall secure them for generations to come from the employment of armed forces. Our joint government has in the meantime failed in repeated and emphatic declarations, which could be heard by all the world, to give expression to our own will and that of the Austro-Hungarian peoples to prepare an end to bloodshed by a peace such as your Holiness has in mind.

Happy in the thought that our desires from the first were directed toward the same object which your Holiness to-day characterizes as one we should strive for, we have taken into close consideration the concrete and practical suggestions of your Holiness and have come to the following conclusions:

With deep-rooted conviction we agree to the leading idea of your Holiness that the future arrangement of the world must be based on the elimination of armed forces and on the moral force of right and on the rule of international justice and legality.

We, too, are imbued with the hope that a strengthening of the sense of right would morally regenerate humanity. We support, therefore, your Holiness's view that the negotiations between the belligerents should and could lead to an understanding by which, with the creation of appropriate guarantees, armaments on land and sea and in the air might be reduced simultaneously, reciprocally and gradually to a fixed limit, and whereby the high seas, which rightly belong to all the nations of the earth, may be freed from domination of paramountcy, and be opened equally for the use of all.

Fully conscious of the importance of the promotion of peace on the method proposed by your Holiness, namely, to submit international disputes to compulsory arbitration, we are also prepared to enter into negotiations regarding this proposal.

If, as we most heartily desire, agreements should be arrived at between the belligerents which would realize this sublime idea and thereby give security to the Austro-Hungarian monarchy for its unhampered future development, it can then not be difficult to find a satisfactory solution of the other questions which still remain to be settled between the belligerents in a spirit of justice and of a reasonable consideration of the conditions for existence of both parties.

If the nations of the earth were to enter, with a desirable peace, into negotiations with one another in the sense of your Holiness's proposals, then peace could blossom forth from them. The nations could attain complete freedom of movement on the high seas, heavy material burdens could be taken from them, and new sources of prosperity opened to them.

Guided by a spirit of moderation and conciliation, we see in the proposals of your Holiness a suitable basis for initiating negotiations with a view to preparing a peace, just to all and lasting, and we earnestly hope our present enemies may be animated by the same ideas. In this spirit we beg that the Almighty may bless the work of peace begun by your Holiness.

German Reply.—Herr Cardinal: Your eminence has been good enough, together with your letter of August 2, to transmit to the Kaiser and King, my most gracious master, the note of his Holiness the Pope, in which his Holiness, filled with grief at the devastations of the world war, makes an emphatic peace appeal to the heads of the belligerent peoples. The Kaiser-King has deigned to acquaint me with your Eminence's letter and to intrust the reply to me.

His Majesty has been following for a considerable time with high respect and sincere gratitude his Holiness's efforts, in a spirit of true impartiality, to alleviate as far as possible the sufferings of the war and to hasten the end of hostilities. The Kaiser sees in the latest step of his Holiness fresh proof of his noble and humane feelings, and cherishes a lively desire that, for the benefit of the entire world, the Papal appeal may meet with success.

The effort of Pope Benedict is to pave the way to an understanding among all peoples, and might more surely reckon on a sympathetic reception and the whole-hearted support from his Majesty, seeing that the Kaiser since taking over the government has regarded it as his principal and most sacred task to preserve the blessings of peace for the German people and the world.

In his first speech from the throne at the opening of the German Reichstag on June 25, 1888, the Kaiser promised that his love of the German Army and his position toward it should never lead him into temptation to cut short the benefits of peace unless war were a necessity, forced upon us by an attack on the empire or its allies. The German Army

should safeguard peace for us, and should peace, nevertheless, be broken, it would be in a position to win it with honor. The Kaiser has, by his acts, fulfilled the promise he then made in 26 years of happy rule, despite provocations and temptations.

In the crisis which led to the present world conflagration his Majesty's efforts were up to the last moment directed toward settling the conflict by peaceful means. After the war had broken out, against his wish and desire, the Kaiser, in conjunction with his high allies, was the first solemnly to declare his readiness to enter into peace negotiations. The German people support his Majesty in his keen desire for peace.

Germany sought within her national frontier the free development of her spiritual and material possessions, and outside the imperial territory unhindered competition with nations enjoying equal rights and equal esteem. The free play of forces in the world in peaceable wrestling with one another would lead to the highest perfecting of the noblest human possessions. A disastrous concatenation of events in the year 1914 absolutely broke off all hopeful course of development and transformed Europe into a bloody battle arena.

Appreciating the importance of his Holiness's declaration, the Imperial Government has not failed to submit the suggestion contained therein to earnest and scrupulous examination. Special measures, which the government has taken in closest contact with representatives of the German people, for discussing and answering the questions raised prove how earnestly it desires, in accordance with his Holiness's desires, and the peace resolution of the Reichstag on July 19, to find a practical basis for a just and lasting peace.

The Imperial Government greets with special sympathy the leading idea of the peace appeal wherein his Holiness clearly expresses the conviction that in the future the material power of arms must be superseded by the moral power of right. We are also convinced that the sick body of human society can only be healed by fortifying its moral strength of right. From this would follow, according to his Holiness's view, the simultaneous diminution of the armed forces of all states and the institution of obligatory arbitration for international disputes.

We share his Holiness's view that definite rules and a certain safeguard for a simultaneous and reciprocal limitation of armaments on land, on sea, and in the air, as well as for the true freedom of the community and high seas, are the things in treating which—the new spirit that in the future should prevail in international relations—should find first hopeful expression. The task would then of itself arise to decide international differences of opinion, not by the use of armed forces, but by peaceful methods, especially by arbitration, whose high peace-producing effect we together with his Holiness fully recognize.

The Imperial Government will in this respect support every proposal compatible with the vital interest of the German Empire and people.

Germany, owing to her geographical situation and economic requirements, has to rely on peaceful intercourse with her neighbors and with distant countries. No people, therefore, has more reason than the German people to wish that instead of universal hatred and battle, a conciliatory fraternal spirit should prevail between nations.

If the nations are guided by this spirit it will be recognized to their advantage that the important thing is to lay more stress upon what unites them in their relations. They will also succeed in settling individual points of conflict which are still undecided, in such a way that conditions of existence will be created which will be satisfactory to every nation, and thereby a repetition of this great world catastrophe would appear impossible.

Only on this condition can a lasting peace be founded which would promote an intellectual *rapprochement* and a return to the economic prosperity of human society.

This serious and sincere conviction encourages our confidence that our enemies also may see a suitable basis in the ideas submitted by his Holiness for approaching nearer to the preparation of future peace under conditions corresponding to a spirit of reasonableness and to the situation in Europe.

EVIDENCE OF "NOTE VERBALE" WITH CONCRETE TERMS.—An accumulation of evidence indicates that Germany at one time intended to include in the note to the Pope specific offers for the evacuation of Belgium and eastern France; that these terms were communicated orally by Foreign Minister von Kühlmann to the Papal Nuncio in Munich, and that the latter, without the explicit official sanction of Germany, passed them on to the Pope. According to persistent rumors these terms were embodied in a postscript to the German note when it was transmitted by the Pope on October 2 to the Allies. A despatch from Rome to the *Progresso Italo-American,* October 3, purports to give the contents of the postscript:

Yesterday the Cardinal Secretary of State delivered to the British Minister accredited to the Vatican, Count de Salis, the replies of Germany and Austria to the peace note of the Pope that he might transmit them to the governments of the Entente. I have already telegraphed that the Teutonic replies were accompanied by a brief note from Cardinal Gasparri.

To-day I am in a position, having learned from a high personage in the Vatican, to communicate to you the contents of the note.

The document emanating from the Vatican announces that Germany is disposed to evacuate Belgium and northern France; offers the mediation of the Holy Father to secure the approaches to peace; espouses a project for the abolition of obligatory military service; proposes the commercial boycott against violators of the pacts of peace, said boycott to be proclaimed by an International Tribunal.

The document, as you may observe, sets forth in substance the recent interview with the Papal Secretary of State.—*N. Y. Times,* 8/10.

SPECIFIC TERMS DENIED.—Berlin despatches of September 29 quoted passages from speeches of Chancellor Michaelis and Secretary von Kühlmann before the main committee of the Reichstag, in which they denied any advance renunciation of occupied territories. The Chancellor said: "It is difficult to understand how anyone acquainted with the international situation and international usages could believe that we would ever be in such a position as, through a one-sided public statement on important questions which are indissolubly bound up with the entire complex of questions which must be discussed at the peace negotiations, to bind ourselves to a solution to our own prejudice."

In discussing the German note, Secretary von Kühlmann emphasized the parliamentary cooperation in its preparation. Its fundamental aim he stated, was to "create an atmosphere in which alone would be possible a fertile exchange of thoughts upon concrete questions," and that "all attempts to drive a wedge between the German people and the German Government .... will be repulsed by the support given to this document."

COUNT CZERNIN THREATENS STIFFER TERMS.—Count Czernin, Austro-Hungarian Foreign Minister, in a speech reported October 3, threatened stiffer demands if the offers made were not accepted, and at the same time explained Austria's sudden shift to the policy of reduced armaments:

In conclusion, Count Czernin threatened that unless peace without annexations or indemnities were immediately accepted it would be necessary for Austria-Hungary to revise its program and seek compensation for further costs of the war.

Arguing that competition in armaments after the war would mean economic ruin for all states and declaring that Austria-Hungary had not been prepared for war and had only made up during the conflict for her former neglected military equipment, Count Czernin continued:

"This war taught us that we must reckon on a great increase in former armaments. With unrestricted armaments the nations would be compelled to increase everything tenfold and the military estimates of the great powers would amount to millions.

"That is impossible. It would mean complete ruin. To return to the armament status of 1914 would be a great reduction, but there would be no meaning in not going further and actually disarming. Hence complete disarmament is the only issue from the difficulty.—*N. Y. Times*, 3/10.

CARDINAL GASPARRI AGAINST CONSCRIPTION.—Commenting, September 22, on the German note, Cardinal Gasparri, the Papal Secretary of State, proposed the suppression of conscription as the easiest measure to secure peace.

"President Wilson's proposal to reduce armaments and impose international arbitration by force through a society of nations is a dream," said Cardinal Gasparri. "An international army to enforce the verdicts of the court of arbitration? In which country would it be located without being influenced by local politics and prejudices? The moon is the only place possible.

"All the other inconveniences and objections could be avoided by suppressing conscription, with the proviso that it could not be re-established without a law approved by the people, which in normal conditions would be improbable, indeed morally impossible.—*N. Y. Times*, 23/9.

ALSACE, NOT BELGIUM, PREVENTS PEACE.—Debate on peace terms was renewed at a plenary sitting of the Reichstag on October 9, in the course of which Secretary von Kühlmann declared Alsace-Lorraine the real stumbling block to peace.

"The great question prolonging the struggle," he said, "is not the future of Belgium, but that of Alsace-Lorraine. Great Britain, according to our information, has pledged herself to France that she will continue the fight for the conquest of Alsace-Lorraine both politically and with her armies so long as France desires to adhere to the program of regaining those provinces. . . . .

"There is but one answer to the question, 'Can Germany in any form make concessions with regard to Alsace-Lorraine?' That answer is no. So long as one German hand can hold a gun the integrity of the territory handed down to us as a glorious inheritance by our forefathers can never be the object of negotiations or concessions.

"When it seemed expedient to France to accept the formula 'without annexations' the French resorted to the transparent trick of bashfully covering up with the word 'disannexation' what is in reality a bare-faced and forceful conquest. The trick is really too clumsy to be worthy of repute. Now, except for France's demand for Alsace-Lorraine, there is absolutely no impediment to peace, no question which could not be solved by negotiations or a settlement in such a way as to render superfluous the further sacrifice of blood.

"Our enemies heretofore have been careful not to reveal their real war aims. What they have told the world is a maximum program, which can only be realized after the complete military defeat of the Central Powers.

"The German Government has never answered this program because we believe in dealing with real sober facts. To our opponents' assertions that they cannot obtain a clear conception of our intentions is our reply to the Pope, and the parliamentary discussions in connection with this. They leave no doubt in the minds of anyone who wishes to understand the essential principles of our peace program."—*N. Y. Times,* 11/11.

GREAT BRITAIN ON THE ALSACE ISSUE.—London, October 11.—Premier Lloyd George, addressing a delegation of insurance committees, on October 11, said he could not think of any statement more calculated to prolong the war than the assertion of the German Foreign Secretary, von Kühlmann, that Germany would never contemplate the making of concessions to France respecting Alsace-Lorraine.

However long the war lasted, said Mr. Lloyd George, England intended to stand by her gallant ally, France, until she redeemed her oppressed children from the degradation of a foreign yoke. This meant that the country must husband its resources, and, when demands were put forward for improvements here and there, his answer was: "Concentrate upon victory."

Addressing a war aims meeting at Liverpool to-night, H. H. Aisquith, former Premier, referred to recent declarations by German statesmen and writers. He said that his previously expressed skepticism regarding the Reichstag's peace resolution was justified by events, for the German parties had been squabbling ever since with infinite acrimony concerning its orthodox interpretation, and confusion had become worse than confounded with the publication of the Chancellor's reply to the Papal note.

"Depend upon it, the world will never find the way to peace through a morass of equivocations and ambiguities. Plain questions and concrete cases are studiously avoided. We are left in the dimness of a rhetorical twilight and we are asked to lay down our arms without other safeguard than that we shall be offering a unique exhibition of the three virtues, faith, hope, and charity."

Admitting that nobody pretends that it would be right for either side to formulate an ultimatum, detailed and exhaustive, which must be accepted chapter and verse as an indispensable condition of peace, and that many things must be left for accommodation and adjustment by negotiation, Mr. Aisquith said that at the same time the Allies must be resolute and definite in their assertion of the means by which peace must be attained.

He referred to the speech of von Kühlmann respecting Alsace-Lorraine and said:

"German diplomacy is not celebrated for deftness, but even in its annals it will be difficult to find a more clumsy or more transparent maneuver than this maladroit attempt to sow discord between ourselves and our French ally. Von Kühlmann relegates the Belgian question to a secondary position.

"I have formerly asked whether Germany was ready to restore Belgium in the only real sense acceptable to the Allies, but I have received no answer, and von Kühlmann, who can be boisterously definite and precise concerning Alsace-Lorraine, preserves regarding Belgium an unbroken, but significant, silence."—*N. Y. Times,* 10/12.

ALLIES TIGHTEN BLOCKADE

GREAT BRITAIN DECLARES ABSOLUTE EMBARGO.—London, October 2.—The *Gazette* prints a proclamation prohibiting the exportation to Sweden, Norway, Denmark, and the Netherlands of all articles, except printed matter of all descriptions and personal effects accompanied by their owners.

Washington, October 2.—Concerted action on the part of the allied countries to isolate Germany from the rest of the world and end all possibility of the neutral nations of Europe supplying her with foods and

ammunition, no matter what the consequence may be, is seen here in the proclamation published in London placing an absolute embargo on the exportation of commodities to Sweden, Norway, Denmark, and the Netherlands, known as the northern neutral group.

The United States took the lead in this movement on July 15, when, by Presidential proclamation, it declared an absolute embargo on the exportation of all products to these countries. Since that time not so much as an ounce of food or fodder, or the smallest quantity of any wartime material, has gone to the northern neutrals of Europe.

So far as the United States was concerned the British blockade was unnecessary, and the embargo also was a much more effective weapon.

It is considered likely here that France, Italy and the other countries aligned against Germany in the war will follow the lead taken by America and Great Britain.—*N. Y. Times*, 3/10.

COMMERCIAL CABLES TO HOLLAND SHUT OFF.—Amsterdam, October 11.—Great Britain has stopped all commercial cable communication with Holland until such time as the Netherlands Government places an absolute restriction on the transit of sand, gravel, and scrap metal through Holland from Germany to Belgium.

UNITED STATES WITHOLDS BUNKER COAL.—To shut off trade between the American continent and Germany by way of "border neutrals," the United States Exports Administrative Council on October 4 announced its decision to refuse coal to neutral vessels, "unless the governments involved agree to terms which the United States sets down." According to the statement published October 5:

"The oilfields of Mexico and the wheat crops of South American countries are by this order cut off absolutely from Germany and the European neutrals unless the shippers who would aid them can obtain coal necessary for the operation of merchant vessels from some source other than the United States. The action will serve to tie up in American and other ports practically all of the neutral shipping unless the governments involved agree to terms which the United States sets down, which will provide either for carrying only cargoes of which the Administrative Board approves or putting their vessels into trade channels which do not reach neutral Europe.

"By taking this attitude the United States does not declare illegal the trade between Mexico, South American countries, and the European neutrals, but simply refuses to be a party thereto by supplying coal to the vessels engaged in it, a right which this government as a belligerent reserves where it appears that the enemy is benefiting."

HOLLAND'S EXPORTS TO GERMANY.—Washington, September 29.—An authentic translation of the negotiations which were made the basis of the German-Dutch agreement of December 1, 1916, and which has come into the hands of government officials, is presented here for the first time.

The United States, it is understood, has taken the position that Holland cannot expect it to aid in feeding the Dutch cattle to produce fats for Germany. While Holland clings to such an agreement, in order to obtain coal and other commodities from Germany, she must depend upon her own resources to keep up her end of the bargain.

The negotiations show that Germany, in the direst need for fats to feed her armies, demanded that Holland give her by far the greater proportion of certain essential exports. Here are a few of the demands:

At least 75 per cent of the total exports of butter.

At least 66⅔ per cent of the total exports of export cheese.

At least as much pig meat and sausage as was exported to other countries, including exports for the relief of sufferers in Belgium.

At least the same amount of live cattle or meats as was exported to other countries.

At least 75 per cent of the total exports of vegetables.

At least 75 per cent of the total exports of fruit and marmalade.

At least 75 per cent of the total exports of fresh and preserved chickens' and ducks' eggs.

At least half the total exports of flax.

This compact has been generally accepted as an illuminating example of the situation which existed while Germany, practically cut off from the world except for the aid that the European neutrals might give, was negotiating not only with Holland, but with the other neutrals, for the kinds of foods—principally fats—which were as vital to the maintenance of her armies as guns, ammunition and high explosives.—*N. Y. Times,* 30/9.

AMERICAN WAR MEASURES

GOVERNMENT TAKES OVER SHIPPING.—Washington, October 12.—As a war emergency measure the United States Shipping Board will requisition all American ocean cargo and passenger-carrying vessels of over 2500 tons on October 15. This action is taken as a means of effectively controlling and regulating ocean freight rates and to enable the government to obtain prompt command of the sea tonnage it needs for war uses. The limit probably will be lowered soon to include vessels of more than 1500 tons.—*N. Y. Times,* 13/10.

GOVERNMENT CONTROL OF FOOD STUFFS.—Washington, October 10.—President Wilson issued a proclamation to-night setting forth the terms under which the Food Administration, after November 1, would control the manufacture, storage, importation, and distribution of practically all of the essential foodstuffs. In it he gave warning that any person, firm, corporation, or association violating the regulations laid down would be subjected to the penalties provided for in the Food Control Bill.

All of the great packing and wholesale concerns which have been accused of controlling the market in the food staples are included in the licensing system created by the proclamation. The President has power to extend the regulations.—*N. Y. Times,* 11/11.

ORDER TO ENFORCE TRADING WITH ENEMY ACT.—On October 6, President Wilson signed the Trading With the Enemy Act, and on October 14 issued an order creating executive machinery for carrying into effect the drastic powers granted by this act and by the Espionage Act of June 15, 1917.

Powers Conferred by the Act.—According to a statement accompanying the order of October 14, the Trading With the Enemy Act contains the following provisions:

1. It has added to the power to embargo all exports conferred upon the President by the Espionage Act, the power to prohibit all imports into the United States except under licenses.

2. It has conferred the power to prohibit or regulate all transfers of credits, money, currency, bullion, and securities between the United States and all foreign countries.

3. It imposes severe criminal penalties on all persons who trade or communicate directly or indirectly with an "enemy" or "ally of an enemy," or with any person acting on their behalf.

4. It provides for the use in the United States of enemy-held patents which may be of assistance to us in carrying on the war.

5. It provides for taking over and administering the property in the United States of "enemies" and "allies of enemies."

6. It confers upon the President complete power to censor all communications of every sort passing between this country and any foreign country.

7. It provides certain regulations with regard to the foreign-language press in the United States.

MACHINERY CREATED BY ORDER OF OCTOBER 14.—The following extracts from the statement issued in the Executive Order of October 14 explain its contents and purpose:

Certain of the powers conferred by the Trading With the Enemy Act the President has directed to be exercised through the State Department, the Treasury Department, the Attorney General, the Post Office Department, the Commerce Department, and the Federal Trade Commission. As to many of the powers conferred upon the President by Congress in this act, no single existing department is interested, and the President has provided for their joint administration by a War Trade Board composed of representatives of the departments which are most vitally concerned.

Exports.—The War Trade Board succeeds to all the functions which have been exercised by the Exports Administrative Board. The proclamations of the President forbidding the export of various articles without a license are continued in full force and effect, but licenses will hereafter be granted by the War Trade Board, instead of by the Exports Administrative Board.

Imports.—The Trading With the Enemy Act confers upon the President the power to prohibit the importation of any article or to impose the terms and conditions upon what may be imported. No proclamation has yet been issued by the President imposing any such prohibition or restriction, but upon the issuance of such proclamation the licensing of such importations will be done by the War Trade Board.

Trading With the Enemy.—The Trading With the Enemy Act makes it unlawful under severe penalties, to trade without a license with any person who, there is probable cause to believe, is an enemy or ally of enemy. The act gives an extremely broad definition of what constitutes trade. It provides that "trade" shall be deemed to mean:

(a) To pay, satisfy, compromise, or give security for the payment or satisfaction of any debt or obligation.

(b) To draw, accept, pay, present for acceptance or payment, or indorse any negotiable instrument or chose in action.

(c) To enter into, carry on, complete, or perform any contract, agreement, or obligation.

(d) To buy or sell, loan or extend credit, trade in, deal with, exchange, transmit, assign, or otherwise dispose of or receive any form of property.

(e) To have any form of business or commercial communication or intercourse with.

The definition of "an enemy" or "an ally of an enemy" requires careful consideration. In the first place, any person, no matter of what nationality, who resides within the territory of the German Empire or the territory of any of its allies or that is occupied by its military forces is expressly made an "enemy" or "ally of enemy" by the act. Even citizens of the United States who have elected to remain within such territory are "enemies" or "allies of the enemy" within the provisions of the act. Further, any person not residing in the United States, of whatever nationality and wherever he resides, who is doing business within such territory, is placed within the definition of "enemy" or "ally of enemy." So also is any corporation created by Germany or its allies. So also is any corporation created by any other nation than the United States and doing business within such territory. Further, for the purposes of this act, the government of any nation with which the United States is at war or the ally of such nation and every subdivision of such government and every officer, official agent, or agency of such government is an "enemy" or "ally of enemy,"

and the act makes no restriction as to where such officer, official, agent, or agency may be located.

It is important for the public to have clearly in mind that not only is it unlawful to trade with an "enemy" or "ally of enemy" without license, but it is equally unlawful to trade with any person, who, there is reasonable cause to believe, is acting for or on account of or for the benefit of an "enemy" or "ally of enemy," and it makes no difference what the nationality or what the residence of such person may be. On the other hand, in dealing with subjects of Germany who are resident in the United States, it is important to remember that, while other provisions of law make it possible to intern them, the mere fact of their nationality does not make them "enemies" within the meaning of this act, and so prevent persons in this country from having ordinary commercial relations with them.

The Trading With the Enemy Act, however, while imposing such stringent provisions, gives power to the President to grant licenses to trade with the enemy. The exercise of this power has been delegated by the President to the War Trade Board. Applications for license to trade with an "enemy" or "ally of enemy," or a person acting on behalf of or for the benefit of an "enemy" or "ally of enemy" should be sent to the War Trade Board.

Communicating With the Enemy.—The Trading With the Enemy Act prohibits and imposes severe penalties on taking or sending any communication in any form out of the United States intended for any enemy or ally of the enemy, and also makes it unlawful to bring in or take out of the United States any form of communication except by mail. Power is given by the act, however, to relieve from these prohibitions by license, and the Secretary of the Treasury is empowered by the President to receive applications for and grant such licenses.

War Trade Council.—In addition to the War Trade Board, the President has created a War Trade Council, composed of the Secretary of State, the Secretary of the Treasury, the Secretary of Agriculture, the Secretary of Commerce, the Food Administrator, and the Chairman of the United States Shipping Board. This War Trade Council will take the place of the Exports Council and will act in an advisory capacity in such matters as may be referred to it by the President or the War Trade Board.

Patents.—The act contains various provisions as to the application for patents by citizens of the United States in enemy and ally of enemy countries during the war, and for the use in the United States by citizens of the United States of enemy-held patents during the war, and also for the suspension of information as to certain patent applications made in the United States, secrecy as to which is necessary for military reasons. The Federal Trade Commission is empowered by the President to deal with all these matters, receiving applications and granting licenses with regard to them.

Custody of Enemy Property.—Among the most important and far-reaching of the provisions of the Trading With the Enemy Act are those dealing with the taking over by this government of the custody and control of "enemy" property within the United States.

The Alien Property Custodian may, under the provisions of the executive order, require a transfer to himself of any property held for or on behalf of an "enemy" or "ally of enemy," or the payment of any money owed to an "enemy" or "ally of enemy" by a person in the United States. In addition, any person in the United States so holding any property or so owing any money may transfer such property or pay such money to the Alien Property Custodian with his consent.

Foreign Exchange.—The President by his executive order has committed to the Secretary of the Treasury the executive administration of the broad powers conferred by the act as to the prohibition and regulation of transfer between the United States and foreign countries of coin, currency, bullion, credits and securities. The Secretary of the Treasury will continue, with the

assistance of the Federal Reserve Banks, to pass on applications for leave to export bullion, coin, and currency. No prohibitions or regulations have as yet been made as to the transfer of credits or securities between the United States and foreign countries.

Censorship Board.—The President has created a Censorship Board to administer such regulations as he may prescribe as to the censorship of cable, telegraph, and mail communications between the United States and foreign countries. This board is composed of representatives respectively of the Postmaster General, of the Secretary of War, of the Secretary of the Navy, of the War Trade Board, and of the Chairman of the Committee on Public Information.

Foreign Language Press.—The Trading With the Enemy Act provides that every paper printed in a foreign language shall furnish translations to the Postmaster General of the matter concerning the war printed by it, unless a permit to omit doing so is granted to it. The administration of this provision is committed to the Postmaster General, and applications for such permits should be made to him.

Transporting an Enemy.—The act provides that it shall be unlawful for any person without a license to transport or attempt to transport into or from the United States, or for any American vessel to transport in any part of the world any citizen of an enemy or allied enemy nation. The administration of this provision is vested in the State Department, and authority is given the Secretary of State to grant the necessary licenses for such transportation.

Clearance Provisions.—Collectors of Customs are given the right to refuse clearance vessels which are transporting cargo in violation of the provisions of the Trading With the Enemy Act. Power to review such refusal of clearance by the Collector is vested in the Secretary of Commerce by the executive order of the President.—*N. Y. Times,* 15/10.

GERMANY

CHANCELLOR USES MUTINY PLOT TO AVERT CRISIS.—In the closing sessions of the Reichstag, during the week which ended October 19, Chancellor Michaelis was forced to reveal the mutiny in the German Navy as a means of averting a threatened vote of censure from a coalition of Center, Progressive, and Socialist parties in the Reichstag. The opposition of this majority was centered chiefly upon Vice Chancellor Helffereich, as a minister held in power by Berlin banking interests. It supported also a resolution condemning the government's attitude toward the propaganda of the new Pan-German "Fatherland Party," wide-spread in the army and public press, which interfered with efforts for peace by negotiation and conciliation.

By connecting the mutiny with socialist influence in the navy, and by the charge that leaders of the mutiny had consulted and received the approval of radical socialist members of the Reichstag, the Chancellor drew off the Centrists and Progressives and left the Socialists in a minority. By this victory, however, he brought the moderate and radical wings of the Socialist party into unified opposition to the government. Attacks on the Michaelis Cabinet were made freely in the Socialist Convention at Würzburg, Bavaria, on October 14.

SOCIALIST DEPUTIES TO BE PROSECUTED.—Copenhagen, October 15.—The *Hamburg Fremdenblatt* says the German Government had decided to prosecute, if possible, Haase, Dittmann, and Vogtherr, the Socialist deputies whose names recently were linked with the mutiny in the German

fleet. The government has submitted evidence against the three deputies to the Imperial Court at Leipsic and, therefore, has declined the suggestion that a Parliamentary committee of investigation be appointed.

RESIGNATION OF ADMIRAL VON CAPELLE.—News of the resignation of Vice Admiral von Capelle was published on October 12.

While the withdrawal of von Capelle was undoubtedly hastened by the tense political quarrel with the Socialists and others in the Reichstag on account of his official revelation of the German naval mutiny, it is not thought here that this was the underlying cause of his withdrawal, which is regarded as marking the failure of Germany's naval campaign last summer. Not only has the U-boat campaign reached a point where American war risk insurance could be reduced on account of the lesser number of sinkings, and where there is no chance for the starvation of England, but in other directions the German Navy has been without accomplishment during the summer.

The German high seas fleet, since the battle of Jutland, has failed to engage the British Navy in battle for supremacy of the seas. What is even more important to Germany, the U-boats, in addition to their failure to shut down supplies for England to the point where it would mean starvation, have also failed to interrupt the steady flow of convoyed American soldiers and munitions to France.

Not one American soldier has been lost in the great task of affording safe sea transportation to the expedition, and no convoyed American supply ship has yet been lost.—*N. Y. Times,* 13/10.

RUSSIA

NEW COALITION CABINET.—Petrograd, October 10.—The new Coalition Government has assumed control of Russia, replacing the Council of Five organized a month ago. Announcement is made that it intends to carry out an active foreign policy with "the purpose of making peace in agreement with our allies as soon as possible."

Following is the official list of the Cabinet, which includes four members of the Constitutional Democrats and one Independent:

Premier, A. F. Kerensky.
Minister of Foreign Affairs, M. I. Terestchenko.
Minister of Interior, M. Nikitin.
Minister of Agriculture, M. Avskentieff.
Minister of Labor, M. Gvozdeff.
Minister of Supplies, M. Prokopovitch.
Minister of Finance, M. Bernatzky.
Minister of Religion, M. Kartasheff.
Minister of Public Welfare, M. Kishkin.
Minister of Trade and Industry, A. I. Konovaloff.
State Controller, M. Smyrnoff.
Minister of Justice, M. Malyantovitch.
Minister of Education, M. Salaskin.
President of the Eumenical Council, M. Tretyakoff.
Minister of War, General Verkhovsky.
Minister of Marine, Admiral Verdervski.
Minister of Ways and Communications, M. Liverevsky.

A. I. Konovaloff, Minister of Trade and Industry, has been appointed Vice-President of the Council of Ministers.

The new government pledges that its business acts will be on the basis of agreements between representatives of the burgeoisie, the tax-paying elements and the revolutionary democracy. It points out that the success of such a program is possible only if the nation is united. The government's statement in conclusion says that it has three principal aims:

To raise the fighting power of the army and navy.
To bring order to the country by fighting anarchy.
To call the Constituent Assembly as soon as possible.—*N. Y. Times,* 11/10.

PRELIMINARY PARLIAMENT.—In accordance with a resolution adopted by the Democratic Congress during its session at Petrograd, a Preliminary Parliament was organized pending the election of a Constituent Assembly. It was decided that the Parliament should consist of 231 members representing Constitutional Democrats as well as Socialist parties, and that it should be strictly subordinate to the Cabinet, exercising only consultative and advisory powers. The first meeting of the Parliament was set for October 20.

CONCESSIONS TO POLAND.—Petrograd, October 16.—M. Terestchenko, Minister of Foreign Affairs, at a meeting last night in observance of the one hundredth anniversary of the death of Kosciusko, the Polish patriot, announced that it was the conviction of the Entente Powers that "any peace should recognize the independence of an indivisible Poland."

This differs from the declaration issued by the Provisional Russian Government last March in which it urged that Poland should be given autonomy under nominal Russian guidance.

Amsterdam, October 16.—Emperor William has sent the following message to General von Beseler, the German Governor General of Poland: "I have found it advisable, in agreement with my illustrious ally, the Emperor of Austria-Hungary, and in the spirit of Article I of the decree of September 12, 1917, to install as members of the Council of Regency of the Kingdom of Poland the Archbishop of Warsaw, Alexander von Laeksoki; the Mayor of Warsaw, Prince Lubomirsky, and the landed proprietor Joseph Honostrowski."

The decree of September 12 transferred the supreme authority in Poland to a Council of Regency of three members. The legislative power is to be exercised by the council, all of whose decrees must be countersigned by a responsible Premier.

One of the first tasks of the council will be the appointment of a Premier, which must be sanctioned by Germany and Austria-Hungary. The decree called for the reorganization of the Polish State Council with increased authority.—*N. Y. Times*, 17/10.

SWEDEN

As a result of the September election in Sweden, the Brantung Socialists returned 86 members to Parliament; Extreme Socialists, 12; Liberals, 62; Conservatives, 58; Peasant Factions, 12. The Brantung pluralty is supposed to represent opposition to the government foreign policy.

On October 2 the Swarz Ministry, in which Admiral Lindeman was Foreign Minister, resigned. On October 12, King Gustave requested M. Widen, a moderate Liberal, to construct a ministry solely of Liberals. It is understood that Hjalmar Brantung, the powerful Socialist leader, preferred to remain independent of the government.

SOUTH AMERICA

ARGENTINA AVOIDS RUPTURE.—Following a vote of the Argentine Senate, 23 to 1, in favor of breaking off relations with Germany, the Chamber of Deputies, on September 25, took similar action by a vote of 53 to 18. The rupture was avoided, however, by the unwillingness of President Irogoyen, and by the receipt of a note from Germany expressing disapproval of the outgivings of her representative in Argentina.

PERU AND URUGUAY SEVER RELATIONS.—Peru broke off diplomatic relations with Germany on October 6. A note to the United States, received October 11, contained the following passage explaining the action and expressing Peru's desire for American continental solidarity:

"It was the Peruvian Government's wish that the policy of the whole continent be a concerted ratification of the attitude of the Washington Government, which took up the defense of neutral interests and insisted on the observance of international law. But the course of events did not result in joint action; each country shaped its course in defense of its own invaded rights as it was individually prompted in its adherence to the principles declared by the United States. Peru, for its part, while endeavoring to give prevalence to a uniform continental policy, maintained with the utmost firmness the integrity of its rights as a sovereign nation in the face of Germany's disregard of the principles of naval warfare.

"It was the defense of those rights which led it to sever its diplomatic relations with the Imperial Government as the result of an outrage for which it duly but vainly claimed appropriate reparation—the sinking of the *Lorton* by a German submarine on the coast of Spain while the ship was plying between neutral ports engaged in a lawful trade without infringing even the German rules respecting closed zone unknown to international law."

URUGUAY, on October 7, severed relations with Germany following a vote of the Chamber of Deputies in favor of such action, 74 to 23. President Viera, in his message to the Parliament, declared that Uruguay had not received any direct offense from Germany, but that it was necessary to espouse the cause of the defenders of justice, democracy, and small nationalities.

Uruguay, on May 1, sent a note to London and Paris, asking for information as to the sinking of the *Gorizia*, a Uruguayan ship, and later made a protest to Germany. In May it joined in the suggestion for concerted action by South American countries toward Germany. On September 14 the Uruguayan Government, in a note to Argentina, approved the action of the Buenos Aires Government in handing his passports to Count von Luxburg. At the same time, Uruguay seized the German ships in her harbors and interned the crews.

ECUADOR BARS GERMAN ENVOY.—On October 8 the Government of Ecuador announced that it would not receive Dr. Perl, the German Envoy, in case he should attempt to come to Quito from Peru. Dr. Perl was appointed minister to both Peru and Ecuador, but his credentials, sent by mail, had not been accepted by the Ecuador Government.

The action of Peru, Uruguay and Ecuador left Argentina and Chile in the south, and Venezuela and Columbia in the north, the only neutral South American states.

REVIEW OF BOOKS

ON

SUBJECTS OF PROFESSIONAL INTEREST

"The Coming Democracy." By Hermann Fernau, author of "Because I am a German." $2.00. (E. P. Dutton & Co.)

The original title, "Durch! zur Demokratie"—"Straight through to Democracy!"—is more appropriate to the author's impassioned style than the tame phrase used by the translator. The book is a strong plea addressed to his fellow Germans for the democratization of the Fatherland. Herr Fernau is not only a democrat, but a pacifist. He argues that most wars have been the work of irresponsible dynasties, that this war was deliberately provoked by the Hohenzollern dynasty, and that there can be no salvation for Germany or safety for the world till that dynasty is overthrown. Just as the French regained their liberties through Sedan, the Germans will recover their's only through a military defeat of the same magnitude. Thus the Prussian pacifist takes a stand squarely opposite to that of the American pacifist.

The book was written before the Russian revolution and the entry of the United States, yet the author's estimate of the issues of the war reads like a paraphrase of the famous words, "to make the world safe for democracy." To him it is "dynasty or humanity; that is the question here. That is the meaning of the world war." And he hammers at this as the central idea of the book. He is careful, also, to draw the President's charitable distinction between the government and its people. Herr Fernau pleads indulgence for his countrymen because they have been fed with lies, because to the great majority it is a war of defence. Yet elsewhere in the book he admits that the poison of Hohenzollern rule has been so insidious that a new generation must arise before the German people can understand democracy. The reader comes to see the Prussian autocracy as a gigantic octopus, reaching to every corner of the empire and grasping every phase of life and thought within its tentacles.

One of the most interesting chapters deals with the influence of Prussianism on the universities. Lord Palmerston described Germany as "a land of damned professors." But in his day the German university boasted of its intellectual freedom. The professors of to-day are Potsdamned. They are, in the words of the book, "the intellectual lieutenants of the Hohenzollern Guard"; for no one can hold a professorship who has not surrendered his intellectual freedom. This situation explains that document of the "Ninety-three Intellectuals" which amazed and disgusted the world in the opening year of the war.

Herr Fernau has taken little trouble with the organization of his material. The book progresses in the back and forward manner of a German sentence. But all of it is interesting, and much of this interest is due to the wealth of historical information that illumines the argument. Nor can one be insensible to the fire and the pathos of the author's plea. His earlier book, "Because I am a German," is forbidden to the German eye on pain of death, and he must realize that this book cannot hope for a better fate. Nevertheless, like a Hebrew prophet, he continues to call on his people to abandon the false gods set up by Bismarck and turn back to the religion of Schiller, trusting that the time will yet come when he will be heard.

W. O. S.

"How to Live at the Front." By Hector MacQuarrie, B. A. Cantab., Second Lieutenant, Royal Field Artillery. 269 pages. $1.25 net. (Philadelphia: J. B. Lippincott Company.)

The appearance of Hector MacQuarrie's book, "How to Live at the Front," at this time, when so many of our young men are bound for that destination, is most opportune. You can take what he says as coming from one who knows, for he was wounded at the front and has recently been convalescing among us. In the most intimate and sympathetic way he is "companion, comforter, guide and friend" to the raw recruit—the rawest can depend upon his advice in the way of individual preparedness, whether it be preserving his tooth brush in the beginning of his career, or preserving his health from the many dangers later on. This big brother introduces the raw recruit to the N. C. O., and tells him of his trials and how they are mutually dependent—but what the N. C. O. says must go. He impresses upon him how to appear smart and emphasizes the moral effect of a clean shave and polished boots; the old British soldier is given as a model along these lines.

The most important chapter is devoted to marking the rocks and hazards where the sirens sing, those dangers which threaten the wrecking of mind, soul and body, for nothing more demoralizing can happen to manhood than acquiring venereal diseases. The havoc caused by them near the front has been much written about during this war, the danger is probably greater than the shells of the enemy, for the disabilities because of them are many and the diseases, in many cases, may be passed on to the next generation. A point which he gives, and one well worth remembering, is that the scarlet woman may not appear as one is accustomed to see her, well advertised as a painted sign, but may be as a modest young girl, with a sweet voice—a much more dangerous siren.

There is a vein of Scotch humor in the book to help over the rough places, and he tells of flippancy at the front when "Jack Johnsons" are coming over, which is probably on the principle of whistling to keep the courage up. Every recruit will find something, perhaps many things, in the book to help him—he should read it.

A. M. D. McC.

"The Unpopular History of the United States: By Uncle Sam Himself: As Recorded in Uncle Sam's Own Words." By Harris Dickson. (New York: Frederick A. Stokes Company.)

The title of this little volume suggests an enlightened and patriotic attempt to persuade the American people, in words all of them will listen to, that our military policy in the past has been dangerously unbusinesslike and based on false theories, that the facts of our military history as distinguished from the fables prove the failure of the volunteer system, and cry aloud for universal training and service, and, at present, the selective draft. That is exactly what Mr. Dickson has tried to do.

That this volume has been written and published is another encouraging incident in the development of American preparedness. It bears witness to three things: (1) Civilian thinkers are beginning to realize the value of General Upton's "Military Policy of the United States," and the necessity of teaching Americans the facts of their own military history. (2) Students of military history have not as a rule had the ability to make such history popular. Among the works on American military history, Upton's treatise, though the most important, is, unfortunately, the driest of dry reading. In editing its mass of statistics, and in "translating" its severe phrasing, Mr. Dickson has rendered a patriotic service. (3) Despite the title of the book—which is literally the truth as well as cleverly disarming—the fact that it is published indicates at least some popular demand for frank and unadorned discussion of our past wars—for a statement, in other words, of just how American wars have been conducted, for better or for worse, as business propositions.

There would seem to be then, a growing, healthy suspicion that the American people have been deceived, and have deceived themselves, concerning their military annals. Fourth of July orations and school histories have conspired to please and deceive rather than to warn and instruct. As Mr. Dickson puts it (speaking as if he were Uncle Sam): "We Americans love bunk. I know what I am talking about. We do love bunk."

It is evident from the foregoing that the author realizes the difficulty of his task. He knows that very many of his readers will not believe what he says; that even those who do believe what he says are apt to be resentful, since frank criticism of American military policy in the past hurts the pride of the average American citizen. The inevitable reply follows: "How strange that we have won all our wars with this 'false' military policy you seem to know so much about!" Mr. Dickson therefore intrenches himself by saying: "No statement is made herein except upon authority of Brevet Major General Emory Upton—endorsed by our own government." Moreover, his point of view throughout is persuasive. He seems constantly to be patting the reader on the back and saying, "I know this is disagreeable to you. I found it so, too. But I have taken my medicine, and I feel better. Come on, and be a sport. If I can take it, you can." (This is not quoted from Mr. Dickson's pages, but arises from the fact that the reviewer's mind is freshly saturated with the most colloquial

colloquialisms of a volume which speaks more popularly than the people themselves.

Granted that it is Uncle Sam who is supposed to tell the story; granted that Upton is dry, and that Mr. Dickson's purpose is to drive his important message "home" by using langauge that is "racy," and downright "American" of the street and the farm; nevertheless, it does not pay to "talk down" too much, lest the man in the street and the farmer to whose ears the message is addressed—the shrewdest judges of human nature the world knows—take exception to a tone in which they detect condescension. It is all right to say, "The woods are full of folks," etc., but what of the following expressions: "The notion that we are some punkins in a scrap," "Overran Mexico before you could say scat," "Facts never leaked into their noggins?" It is the American farmer or his counterfeit presentment on the stage who talks like that? His manner of speech is something like this in real life, in some parts of the country. But let someone try to curry favor with him by imitating his speech; let someone deliver a speech to him in shirtsleeves at a county fair. Is it convincing?

This criticism is not intended to belittle Mr. Dickson's patriotic and on the whole wise effort, but to suggest that in so great a cause as that in which the author has enlisted, a cause whose success or failure will make or mar the future of the nation, no criticism is wasted which may help him in his next book to be more effective, if only by the tithe of a hair.

In future editions of "The Unpopular History of the United States"—and it is hoped there will be many more editions—it would be worth while to go further than the Civil War, Upton or no Upton, and tell the true story of the war with Spain. Of all our wars, the Spanish War is most likely to be misinterpreted as a triumph of American military policy, so-called. Had Spain exerted all her skill to lose the war, she could hardly have lost it more quickly, or more surely. In future editions, also, it is suggested, a slight correction should be made. On page 20, paragraph 3, the complaint attributed to Washington was made by General Schuyler.

H. C. W.

"The Destruction of Merchant Ships under International Law." By Sir Frederick Smith, K. C., M. P. In two parts. Contains about 90 pages of text, neatly bound and printed in good, clear type. $1.75. (New York: E. P. Dutton & Co.)

Part I refers to enemy merchantmen. Under this heading the author discusses the treatment to which enemy merchant ships may be subjected by belligerent war vessels. This part is treated fully in a very clear and convincing manner. Many quotations are given from various authorities on international law, and numerous "cases" and references are cited. These lead naturally to a concisely worded and clearly expressed conclusion.

Part II refers to neutral merchantmen and their treatment by belligerent war vessels. It is not so convincing as Part I, due probably to the divergence of views on this subject by the leading nations, as instanced by the conferences of the Hague and London Naval Conference. It is treated in the same manner as Part I, and the points of agreement are clearly brought

out. In the concluding paragraph the various ways are cited in which Germany has violated these generally accepted principles.

The book as a whole gives in a few pages the practice and doctrine of the leading nations with regard to the treatment of merchant vessels by belligerents up to the time of the present war.

G. W. L.

"Mechanical Processes," 1917 (Danforth).

This text has been used at the United States Naval Academy for the instruction of midshipmen in the third class since 1912. As the work is employed in both class-rooms and shops it is essential that it keep pace with the advance of the mechanical arts and with new methods of production of the materials used in engineering construction. To this end a complete revision was undertaken by Lieutenant Danforth in connection with his duties as inspector of material in the Philadelphia district. He was enabled also to keep in touch with the current needs of instruction in the Department of Marine Engineering and Naval Construction, at Annapolis.

In general treatment, the subject matter conforms to the course of study of midshipmen, but, as an elementary approach to the wide field of engineering, it is well adapted to the needs of all students.

The text naturally falls into two divisions:

(a) Materials used and their production, treatment and re-manufacture.

(b) Shops and equipment for the construction and repair of machinery.

A full chapter on "Fuels" is included in connection with the reduction of ores. The portions of the text dealing with the methods of iron and steel production have been brought up to date and the subjects themselves are dealt with simply and in the detail necessary for the beginner's use. Illustrations are copious and interesting.

Throughout, stress is laid upon the increasing importance of electricity in metallurgy and the part played by the new science of metallography in determining internal structure is explained.

The mechanical treatment of metals is comprehensively discussed and the subject of heat treatment includes a reference to the new and popular process of shaping the softer metals by "Die Casting." With this process is produced a great variety of castings of complicated shapes, such as are used in automobiles, fittings for instruments, cash registers, etc. The casting is done under pressure and a well-formed part of homogeneous structure is obtained.

Under the title of "Re-Manufacture of Metals," the production of sheet iron, tin plate, tools, wire, drop forgings, pipes and tubes, are among the numerous operations described.

The shops of an engineering plant are taken up by the author in detail and the use as well as the description of their equipment is explained. In particular is this noticeable with regard to the steps of pattern making and the subsequent operations of moulding.

The chapters relating to the "Machine Shop" and the "Boiler Shop" are presented in an interesting and complete manner and are instances of the book's value as a practical manual for the student whose future duties will demand a working knowledge of mechanical processes in general.

W. T. C.

"Army and Navy Information. Uniforms, Organization, Arms and Equipment of the Warring Powers." By Major DeWitt Clinton Falls, N. G., N. Y. Illustrated by six color plates and thirty line cuts by the author. 191 pages. $1.00 net. (New York: E. P. Dutton & Co.)

"Hospital French: Questions and General Conversation (English-French)." Prepared for use by the doctors and nurses of the hospital units working in the base hospitals in France. Translated by Ernest Perrin. 37 pages. 25 cents net. (New York: E. P. Dutton & Co.)

Invaluable in that the subject matter here treated is so technical that it could not be found in any ordinary text-book. The little booklet seems to cover completely all the relations of doctor and nurse to the patient.

NOTICE

The U. S. Naval Institute was established in 1873, having for its object the advancement of professional and scientific knowledge in the Navy. It is now in its forty-fourth year of existence, trusting as heretofore for its support to the officers and friends of the Navy. The members of the Board of Control cordially invite the co-operation and aid of their brother officers and others interested in the Navy, in furtherance of the aims of the Institute, by the contribution of papers and communications upon subjects of interest to the naval profession, as well as by personal support and influence.

On the subject of membership the Constitution reads as follows:

ARTICLE VII

Sec. 1. The Institute shall consist of regular, life, honorary and associate members.

Sec. 2. Officers of the Navy, Marine Corps, and all civil officers attached to the Naval Service, shall be entitled to become regular or life members, without ballot, on payment of dues or fees to the Secretary and Treasurer. Members who resign from the Navy subsequent to joining the Institute will be regarded as belonging to the class described in this Section.

Sec. 3. The Prize Essayist of each year shall be a life member without payment of fee.

Sec. 4. Honorary members shall be selected from distinguished Naval and Military Officers, and from eminent men of learning in civil life. The Secretary of the Navy shall be, *ex officio*, an honorary member. Their number shall not exceed thirty (30). Nominations for honorary members must be favorably reported by the Board of Control, and a vote equal to one-half the number of regular and life members, given by proxy or presence, shall be cast, a majority electing.

Sec. 5. Associate members shall be elected from Officers of the Army, Revenue Cutter Service, foreign officers of the Naval and Military professions, and from persons in civil life who may be interested in the purposes of the Institute.

Sec. 6. Those entitled to become associate members may be elected life members, provided that the number not officially connected with the Navy and Marine Corps shall not at any time exceed one hundred (100).

Sec. 7. Associate members and life members, other than those entitled to regular membership, shall be elected as follows: "Nominations shall be made in writing to the Secretary and Treasurer, with the name of the member making them, and such nominations shall be submitted to the Board of Control. The Board of Control will at each regular meeting ballot on the nominations submitted for election, and nominees receiving a majority of the votes of the board membership shall be considered elected to membership in the United States Naval Institute."

Sec. 8. The annual dues for regular and associate members shall be two dollars, all of which shall be for a year's subscription to the UNITED STATES NAVAL INSTITUTE PROCEEDINGS, payable upon joining the Institute, and upon the first day of each succeeding January. The fee for life membership shall be thirty dollars, but if any regular or associate member has paid his dues for the year in which he wishes to be transferred to life membership, or has paid his dues for any future year or years, the amount so paid shall be deducted from the fee for life membership.

ARTICLE X

Sec. 2. One copy of the PROCEEDINGS, when published, shall be furnished to each regular and associate member (in return for dues paid), to each life member (in return for life membership fee paid), to honorary members, to each corresponding society of the Institute, and to such libraries and periodicals as may be determined upon by the Board of Control.

The PROCEEDINGS are published monthly; subscription for non-members, $3.00; enlisted men, U. S. Navy, $2.00. Single copies, by purchase, 30 cents; issues preceding January, 1917, 50 cents.

All letters should be addressed U. S. Naval Institute, Annapolis, Md., and all checks, drafts, and money orders should be made payable to the same.

SPECIAL NOTICE

NAVAL INSTITUTE PRIZE ESSAY, 1918

A prize of two hundred dollars, with a gold medal, and a life-membership (unless the author is already a life member) in the Institute, is offered by the Naval Institute for the best essay presented on any subject pertaining to the naval profession.

On the opposite page are given suggested topics. Essays are not limited to these topics and no additional weight will be given an essay in awarding the prize because it is written on one of these suggested topics over one written on any subject pertaining to the naval profession.

The following rules will govern this competition:

1. The award for the prize will be made by the Board of Control, voting by ballot and without knowledge of the names of the competitors.

2. Each competitor to send his essay in a sealed envelope to the Secretary and Treasurer on or before January 1, 1918. The name of the writer shall not be given in this envelope, but instead thereof a motto. Accompanying the essay a separate sealed envelope will be sent to the Secretary and Treasurer, with the motto on the outside and writer's name and motto inside. This envelope is not to be opened until after the decision of the Board.

3. The successful essay to be published in the PROCEEDINGS of the Institute; and the essays of other competitors, receiving honorable mention, to be published also, at the discretion of the Board of Control; and no change shall be made in the text of any competitive essay, published in the PROCEEDINGS of the Institute, after it leaves the hands of the Board.

4. If, in the opinion of the Board of Control, the best essay presented is not of sufficient merit to be awarded the prize, it may receive "Honorable Mention" or such other distinction as the Board may decide.

5. In case one or more essays receive "Honorable Mention," the writers thereof will receive a minimum prize of seventy-five dollars and a life-membership (unless the author is already a life member) in the Institute, the actual amounts of the awards to be decided by the Board of Control in each case.

6. An essay not having received honorable mention may be published also, at the discretion of the Board of Control, but only with the consent of the author.

7. The essay is limited to fifty (50) printed pages in the PROCEEDINGS of the Institute.

8. It is requested that all essays be submitted typewritten and in duplicate, if practicable; essays submitted written in longhand and in single copy will, however, receive equal consideration.

9. In the event of the prize being awarded to the winner of a previous year, a gold clasp, suitably engraved, will be given in lieu of the gold medal.

By direction of the Board of Control.

J. W. GREENSLADE,
Commander, U. S. N., Secretary and Treasurer.

PRIZE ESSAY TOPICS

SUGGESTED AT THE INVITATION OF THE BOARD OF CONTROL

BY

THE PRESIDENT OF THE NAVAL INSTITUTE, THE SUPERINTENDENT OF THE NAVAL ACADEMY, THE PRESIDENT OF THE NAVAL WAR COLLEGE, AND THE COMMANDERS-IN-CHIEF OF THE ATLANTIC, PACIFIC AND ASIATIC FLEETS.

"The Mutual Relations of Gunnery and Tactics."

"The Place of the Naval Officer in International Affairs."

"The Evolution of Naval Doctrine from National Character."

"The Training of Enlisted Personnel to Produce Modern Man-o'-Warsmen: (a) Military Training; (b) Moral Training; (c) Education."

"The Organization, Employment and Training of Reserve Fleets and Flotillas."

LIST OF PRIZE ESSAYS

"WHAT THE NAVY HAS BEEN THINKING ABOUT"

1879

Naval Education. Prize Essay, 1879. By Lieut. Commander A. D. Brown, U. S. N.

NAVAL EDUCATION. First Honorable Mention. By Lieut. Commander C. F. Goodrich, U. S. N.

NAVAL EDUCATION. Second Honorable Mention. By Commander A. T. Mahan, U. S. N.

1880

"The Naval Policy of the United States." Prize Essay, 1880. By Lieutenant Charles Belknap, U. S. N.

1881

The Type of (I) Armored Vessel, (II) Cruiser Best Suited to the Present Needs of the United States. Prize Essay, 1881. By Lieutenant E. W. Very, U. S. N.

SECOND PRIZE ESSAY, 1881. By Lieutenant Seaton Schroeder, U. S. N.

1882

Our Merchant Marine: The Causes of Its Decline and the Means to Be Taken for Its Revival. "Nil clarius aquis." Prize Essay, 1882. By Lieutenant J. D. Kelley, U. S. N.

"MAIS IL FAUT CULTIVER NOTRE JARDIN." Honorable Mention. By Master C. G. Calkins, U. S. N.

"SPERO MELIORA." Honorable Mention. By Lieut. Commander F. E. Chadwick, U. S. N.

"CAUSA LATET: VIS EST NOTISSIMA." Honorable Mention. By Lieutenant R. Wainwright, U. S. N.

1883

How May the Sphere of Usefulness of Naval Officers Be Extended in Time of Peace with Advantage to the Country and the Naval Service? "Pour encourager les Autres." Prize Essay, 1883. By Lieutenant Carlos G. Calkins, U. S. N.

"SEMPER PARATUS." First Honorable Mention. By Commander N. H. Farquhar, U. S. N.

"CULIBET IN ARTE SUA CREDENDUM EST." Second Honorable Mention. By Captain A. P. Cooke, U. S. N.

1884

The Reconstruction and Increase of the Navy. Prize Essay, 1884. By Ensign W. I. Chambers, U. S. N.

1885

Inducements for Retaining Trained Seamen in the Navy, and Best System of Rewards for Long and Faithful Service. Prize Essay, 1885. By Commander N. H. Farquhar, U. S. N.

1886

What Changes in Organization and Drill Are Necessary to Sail and Fight Effectively Our Warships of Latest Type? "Scire quod nescias." Prize Essay, 1886. By Lieutenant Carlos G. Calkins, U. S. N.

THE RESULT OF ALL NAVAL ADMINISTRATION AND EFFORTS FINDS ITS EXPRESSION IN GOOD ORGANIZATION AND THOROUGH DRILL ON BOARD OF SUITABLE SHIPS. Honorable Mention. By Ensign W. L. Rodgers, U. S. N.

1887

The Naval Brigade: Its Organization, Equipment and Tactics. "In hoc signo vinces." Prize Essay, 1887. By Lieutenant C. T. Hutchins.

1888

Torpedoes. Prize Essay, 1888. By Lieut. Commander W. W. Reisinger, U. S. N.

1891

The Enlistment, Training and Organization of Crews for Our Ships of War. Prize Essay, 1891. By Ensign A. P. Niblack, U. S. N.

DISPOSITION AND EMPLOYMENT OF THE FLEET: SHIP AND SQUADRON DRILL. Honorable Mention, 1891. By Lieutenant R. C. Smith, U. S. N.

1892

Torpedo-boats: Their Organization and Conduct. Prize Essay, 1892. By Wm. Laird Clowes.

1894

The U. S. S. Vesuvius, with Special Reference to Her Pneumatic Battery. Prize Essay, 1894. By Lieut. Commander Seaton Schroeder, U. S. N.

NAVAL REFORM. Honorable Mention, 1894. By Passed Assistant Engineer F. M. Bennett, U. S. N.

1895

Tactical Problems in Naval Warfare. Prize Essay, 1895. By Lieut. Commander Richard Wainwright, U. S. N.

A SUMMARY OF THE SITUATION AND OUTLOOK IN EUROPE. An Introduction to the Study of Coming War. Honorable Mention, 1895. By Richmond Pearson Hobson, Assistant Naval Constructor, U. S. N.

SUGGESTIONS FOR INCREASING THE EFFICIENCY OF OUR NEW SHIPS. Honorable Mention, 1895. By Naval Constructor Wm. J. Baxter, U. S. N.

THE BATTLE OF THE YALU. Honorable Mention, 1895. By Ensign Frank Marble, U. S. N.

1896

The Tactics of Ships in the Line of Battle. Prize Essay, 1896. By Lieutenant A. P. Niblack, U. S. N.

THE ORGANIZATION, TRAINING AND DISCIPLINE OF THE NAVY PERSONNEL AS VIEWED FROM THE SHIP. Honorable Mention, 1896. By Lieutenant Wm. F. Fullam, U. S. N.

NAVAL APPRENTICES, INDUCEMENTS, ENLISTING AND TRAINING. The Seaman Branch of the Navy. Honorable Mention, 1896. By Ensign Ryland D. Tisdale, U. S. N.

THE COMPOSITION OF THE FLEET. Honorable Mention, 1896. By Lieutenant John M. Ellicott, U. S. N.

1897

Torpedo-boat Policy. Prize Essay, 1897. By Lieutenant R. C. Smith, U. S. N.

A PROPOSED UNIFORM COURSE OF INSTRUCTION FOR THE NAVAL MILITIA. Honorable Mention, 1897. By H. G. Dohrman, Associate Member, U. S. N. I.

TORPEDOES IN EXERCISE AND BATTLE. Honorable Mention, 1897. By Lieutenant J. M. Ellicott, U. S. N.

1898

Esprit de Corps: A Tract for the Times. Prize Essay, 1898. By Captain Caspar Frederick Goodrich, U. S. N.

OUR NAVAL POWER. Honorable Mention, 1898. By Lieut. Commander Richard Wainwright, U. S. N.

TARGET PRACTICE AND THE TRAINING OF GUN CAPTAINS. Honorable Mention, 1898. By Ensign R. H. Jackson, U. S. N.

1900

Torpedo Craft: Types and Employment. Prize Essay, 1900. By Lieutenant R. H. Jackson, U. S. N.

THE AUTOMOBILE TORPEDO AND ITS USES. Honorable Mention, 1900. By Lieutenant L. H. Chandler, U. S. N.

1901

Naval Administration and Organization. Prize Essay, 1901. By Lieutenant John Hood, U. S. N.

1903

Gunnery in Our Navy. The Causes of Its Inferiority and Their Remedies. Prize Essay, 1903. By Professor Philip R. Alger, U. S. N.

A NAVAL TRAINING POLICY AND SYSTEM. Honorable Mention, 1903. By Lieutenant James H. Reid, U. S. N.

SYSTEMATIC TRAINING OF THE ENLISTED PERSONNEL OF THE NAVY. Honorable Mention, 1903. By Lieutenant C. L. Hussey, U. S. N.

OUR TORPEDO-BOAT FLOTILLA. The Training Needed to Insure Its Efficiency. Honorable Mention, 1903. By Lieutenant E. L. Beach, U. S. N.

1904

The Fleet and Its Personnel. Prize Essay, 1904. By Lieutenant S. P. Fullinwider, U. S. N.

A PLEA FOR A HIGHER PHYSICAL, MORAL AND INTELLECTUAL STANDARD OF THE PERSONNEL FOR THE NAVY. Honorable Mention, 1904. By Medical Inspector Howard E. Ames, U. S. N.

1905

American Naval Policy. Prize Essay, 1905. By Commander Bradley A. Fiske, U. S. N.

THE DEPARTMENT OF THE NAVY. Honorable Mention, 1905. By Rear Admiral Stephen B. Luce, U. S. N.

1906

Promotion by Selection. Prize Essay, 1906. By Commander Hawley O. Rittenhouse, U. S. N.

THE ELEMENTS OF FLEET TACTICS. First Honorable Mention, 1906. By Lieut. Commander A. P. Niblack, U. S. N.

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1909

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1910

The Merchant Marine and the Navy. Prize Essay, 1910. By Naval Constructor T. G. Roberts, U. S. N.

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1911

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1912

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INSPECTION DUTY AT THE NAVY YARDS. Honorable Mention, 1912. By Lieut. Commander T. D. Parker, U. S. N.

1913

The Greatest Need of the Atlantic Fleet. Prize Essay, 1913. By Lieut. Commander Harry E. Yarnell, U. S. N.

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TRAINED INITIATIVE AND UNITY OF ACTION. Second Honorable Mention, 1913. By Lieut. Commander Dudley W. Knox, U. S. N.

1914

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NAVAL POLICY AS IT RELATES TO THE SHORE ESTABLISHMENT AND THE MAINTENANCE OF THE FLEET. Honorable Mention, 1914. By Captain John Hood, U. S. N.

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1915

The Rôle of Doctrine in Naval Warfare. Prize Essay, 1915. By Lieut. Commander Dudley W. Knox, U. S. N.

AN AIR FLEET: OUR PRESSING NAVAL WANT. First Honorable Mention, 1915. By Lieut. Commander Thomas Drayton Parker, U. S. N.

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DEFENCE AGAINST SURPRISE TORPEDO ATTACK. Third Honorable Mention, 1915. By Ensign R. T. Merrill, 2d, U. S. N.

1916

The Moral Factor in War. Prize Essay, 1916. By Lieutenant (J. G.) H. H. Frost, U. S. N.

NAVAL PERSONNEL. First Honorable Mention, 1916. By Lieut. Commander J. K. Taussig, U. S. N.

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SOME UNDERLYING PRINCIPLES OF MORALE. Third Honorable Mention, 1916. By Commander Dudley W. Knox, U. S. N.

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1917

Commerce Destroying in War. Prize Essay, 1917. By Commander Lyman A. Cotten, U. S. Navy.

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